THE AFFECT DIATHESIS HYPOTHESIS: The Role of Emotions in the Core Deficit in Autism and in the Development of Intelligence and Social Skills

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Abstract. *In this paper we will explore the role of affect in the core deficit in autism and in the development of intelligence and social skills. We discuss how children with autistic spectrum disorders may uniquely, for biological reasons, miss a critical developmental capacity, the ability to connect affect or intent to motor planning and sequencing capacities as well as symbol formation and, therefore, have a difficult time engaging in the long reciprocal chains of affective interaction so necessary for creative and abstract thinking and high-level social skills (Affect Diathesis Hypothesis). We will also discuss how these same affective interactions underlie intelligence and social development. Additionally, we explain that to improve assessments and interventions for children with a variety of challenges including autistic spectrum disorders, it is imperative to appreciate the role of affective interchanges in disordered and healthy development. Finally, we explain that to fully operationalize the role of affective interaction and the Affect Diathesis Hypothesis for the assessment and intervention process, we have formulated the Developmental, Individual-Difference, Relationship-Based model (DIR) (Greenspan, 1992, 1997b; Greenspan & Wieder, 1997, 1998, 1999).*

The Affect Diathesis Hypothesis

Introduction

There is a growing appreciation of the role of emotional interactions in human development. It's been long acknowledged that affective exchanges influence such basic capacities as the formation of relationships, self esteem, and impulse control. Recent studies suggest that emotional interaction in infancy and early childhood also influences cognitive and language capacities. For example, higher quality care, including emotionally sensitive caregiving, is associated with stronger cognitive, language, and emotional and social development (NICHD, 1998, 1999, 2000; Vandell & Wolfe, 2000; Peisner-Feinberg, et al., 1999). Risk factors that undermine

caregiver and family emotional functioning are associated with compromises to intellectual functioning (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1986; Sameroff, Seifer, Baldwin, & Baldwin, 1993). A large empirical base, neurological research looking at brain lesions interfering with emotional regulation, explorations of the types of thinking that are part of skillful social interactions (i.e., emotional intelligence), and concepts of multiple intelligences have further increased interest in the role of emotions (Shonkoff & Phillips, 2000; Damasio, 1994; Goleman, 1995; Gardner, 1983).

In spite of greater interest in the role of emotions in human development, however, there has not been sufficient understanding of how emotions exert their influence. How do emotions and emotional interactions affect intelligence and its related cognitive and language capacities as well as many complex social and self-regulation capacities? What are the psychological mechanisms of action by which affects work on these different aspects of the mind?

In *The Growth of the Mind* (Greenspan, 1997), we presented a theory of the process through which emotional interactions influence intelligence. This theory suggested that affective interactions emerge earlier than the sensorimotor schemes postulated by Piaget (1962) and that they are the most primary probes we use to understand, conceptualize, and "double code" our experiences with the world. It also suggested that most types of abstract thinking are based on reflections on these personal affective experiences.

In this article, we further develop this theory regarding how emotional processes influence various aspects of the mind. The *Affect Diathesis Hypothesis* examines the critical role of affective interactions in self-regulation, communication, language, creating meanings, and constructing a sense of reality. It also examines how various types of deficits in the expectable diathesis (i.e., spread) of affects during early development contributes to our understanding of autistic phenomena and other developmental and emotional problems.

Part 1: The Affect Diathesis Hypothesis and Autistic Spectrum Disorders

Among the many symptoms of autism, language, cognitive, and social deficits are prominent. Recent studies suggest that these compromises can be conceptualized as a series of functional developmental deficits. The pattern of these deficits provide clues regarding a core psychological mechanism that may express the neurological differences characterizing autistic spectrum disorders. When children with autism are compared to children without autism, and level of intelligence, as measured with IQ tests, is controlled for, there are a number of autism-specific functional developmental problems. These include deficits in the ability for empathy and seeing the world from another person's perspective in both physical and emotional contexts (theory of mind) (Baron-Cohen, 1994); higher-level abstract thinking, including making inferences (Minshew & Goldstein, 1998); and shared

attention, including social referencing and problem-solving (Mundy, Sigman, & Kasari, 1990). In addition, deficits in the capacities for affective reciprocity (Baranek, 1999; Dawson & Galpert, 1990; Lewy & Dawson, 1992; Osterling & Dawson, 1994; Tanguay, 1999; Tanguay, Robertson, & Derrick, 1998) and functional (pragmatic) language (Wetherby & Prizant, 1993) also appear specific to autism.

Do these functional developmental deficits stem from a common pathway? In clinical work with infants and children with biological and environmental challenges and without challenges, we have found that the capacities for empathy, psychological mindedness, abstract thinking, social problem-solving, functional language, and affective reciprocity all stem from the infant's ability to connect affect or intent to motor planning capacities and emerging symbols (Greenspan, 1979, 1989, 1997a). Relative deficits in this core capacity leads to problems in higher-level emotional and intellectual processes. The core psychological deficit in autism may, therefore, involve an inability to connect affect (i.e., intent) to motor planning and sequencing capacities and symbol formation.

A child's capacity to connect affect to motor planning and emerging symbols becomes relatively apparent between 9 and 18 months of age as the infant shifts from simple patterns of engagement and reciprocity to complex chains of affective reciprocity that involve problem-solving interactions. Consider a 14-month-old child who takes his father by the hand and pulls him to the toy area, points to the shelf, and motions for a toy. As Dad picks him up, and he reaches for and gets the toy, he nods, smiles, and bubbles with pleasure. For this complex, problem-solving social interaction to occur, the infant needs to have an emotional desire or wish (i.e., intent or affective interest) that indicates what he wants. The infant then needs to connect his desire or affective interest to an action plan (i.e., a plan to get his toy). The direction-giving affects and the action plan together enable the child to create a pattern of meaningful, social, problem-solving interactions. Without this connection between affect and action plans, complex interactive problem-solving patterns are not possible. Action plans without affective direction or meaning tend to become repetitive (perseverative), aimless, or self-stimulatory, which is what is observed when there is a deficit in this core capacity.

As the ability to form symbols emerges, the child needs to connect her inner affects (intent) to symbols to create meaningful ideas, such as those involved in functional language, imagination, and creative and logical thought. The meaningful use of symbols usually emerges from earlier and continuing meaningful (affect-mediated) problem-solving interactions that enable a toddler to understand the patterns in her world and eventually use symbols to convey these patterns in thought and dialogue. Without affective connections, symbols like action plans are used in a repetitive (perseverative) manner (e.g., scripting, echolalia).

The capacity to connect affect to action plans and symbols is likely part of a larger transformation of affect. The infant goes from global and/or catastrophic affective patterns (in the early months of life) to reciprocal ones. The capacity for engaging in a continuous flow of reciprocal affective interactions enables the child to modulate

mood and behavior, functional preverbal and verbal communication, and thinking. It also enables more flexible scanning of the environment because the child gets feedback from what he sees and, based on that feedback, explores further. There is, therefore, more integrated visual-spatial and motor functioning because intense global affects push for discharge and vigilant or overly focused or highly distractible visual-motor patterns, whereas long chains of reciprocal interaction support back-and-forth exploration of the environment and, therefore, flexible, broad, integrated perceptual patterns.

In facilitating back-and-forth interaction with the environment, the capacity for reciprocal interaction also facilitates associative learning. Associative learning (building up a reservoir of related experiences, thoughts, feelings, and behaviors which give range and depth to one's personality, inner life, and adaptive responses) is necessary for healthy mental growth. Its absence leads to rigid, mechanical feelings, thinking, and behavior patterns, as are often seen in autistic spectrum disorders.

Reciprocal, affective interactions and affectively-guided problem-solving interactions and symbols, as can be seen, are necessary for all the unique capacities that distinguish individuals with autism from individuals without autism, as outlined earlier. For example, long chains of social reciprocity depend on affect guiding interactive social behavior. Shared attention, which includes social referencing and shared problem-solving, also depends on affect guiding interactive social behavior. Empathy and theory of mind capacities depend on the ability to understand both one's own affects or feelings and another person's affects or feelings and to project oneself into the other person's mindset. This complex emotional and cognitive task begins with the ability to exchange affect signals with another person and, through these exchanges, emotionally sense one's own intent and the other person's intent through a sense of "self" in interaction with another. Similarly, higher-level abstract thinking skills, such as making inferences, depend on the ability to generate new ideas from one's own affective experiences and then reflect on and categorize them (Greenspan, 1997a).

In observations of infants and toddlers heading into autistic patterns and in taking careful histories of older children with autism, we noted that children with autistic spectrum patterns did not fully make the transition from simple patterns of engagement and interaction into complex affect-mediated, social problem-solving interactions. They, by and large, did not progress to a continuous flow of back-and-forth, affective, problem-solving interchanges (i.e., a continuous flow of circles of communication). Even affectionate children who were repeating a few words or memorizing numbers and letters, and who went on to evidence autistic patterns, did not master, for the most part, this early capacity to engage in a continuous flow of affect-mediated, gestural interactions. They were also unable to develop empathy and creative and abstract thinking unless they were involved in an intervention that focused on facilitating affect-mediated interactions.

In a review of the functional developmental profiles of 200 children with autistic spectrum disorders, we observed that most of the children shared this unique

processing deficit. Approximately two-thirds of the children who developed autistic spectrum disorders had this unique type of biologically based processing deficit that involved the connection of affect or intent to motor planning and sequencing capacities as well as to emerging symbolic capacities (Greenspan & Wieder, 1997). At the same time, however, the children differed with regard to other processing deficits involving their auditory, motor planning, visual-spatial, and sensory modulation abilities. These differences accounted for the different types and degrees of language, motor, and cognitive impairments that accompany the fundamental deficit in engaging in fully purposeful and meaningful social and intellectual interactions.

The hypothesis that explores the connection between affect and different processing capacities (the core deficit) is called the *affect diathesis hypothesis*. In this hypothesis, as indicated previously, a child uses his affect to provide intent (i.e., direction) for his actions and meaning for his words. Typically, during the second year of life, a child begins to use his affect to guide intentional problem-solving behavior and, later on, meaningful use of symbols and language. Through many affective problem-solving interactions, the child develops complex social skills and higher-level emotional and intellectual capacities.

Because this unique processing deficit occurs early in life, it can undermine the toddler's capacity to engage in expectable learning interactions essential for many critical emotional and cognitive skills. For example, she may have more difficulty eliciting ordinary expectable interactions from her parents and the people in her immediate environment. She may perplex, confuse, frustrate, and undermine purposeful, interactive communication with even very competent parents. Without appropriate interaction, she may not be able to comprehend the rules of complex social interactions or to develop a sense of self. These may include implicit social functions and social "rules," and developing friendships and a sense of humor, which are learned at an especially rapid rate between 12 and 24 months of age (Bell, 1970; Emde, Biringen, Clyman, & Oppenheim, 1991; Greenspan, 1979, 1997a; Kagan, 1981; Piaget 1981/1954; Werner & Kaplan, 1963; Winnicott, 1931). By the time a child with processing difficulties receives professional attention, her challenging interaction patterns with her caregivers have, therefore, excluded her from important learning interactions and may be intensifying her difficulties. The loss of engagement and intentional, interactive relatedness to key caregivers may cause her to withdraw more idiosyncratically into her own world and become even more aimless and/or repetitive. What later looks like a primary biological deficit may, therefore, be part of a dynamic process through which the child's lack of affective reciprocal interactions has intensified specific, early, biologically-based processing problems and derailed the learning of critical social and intellectual skills.

The capacity for long chains of affective reciprocity may have early roots which can potentially lead to earlier opportunities for identifying risk patterns. A precursor of the capacity to connect affect to motor planning and symbol formation in the second year of life may be the capacity observed initially in the early months of life for connecting motor actions to interactive, affective rhythms conveyed through facial expressions, vocalizations, or other gestures. For example, babies will move

rhythmically to the rhythm of their mother's voice (Condon & Sander, 1974; Condon, 1975). We are currently conducting studies to see if children at risk for autistic spectrum disorders evidence a deficit in their earlier, rhythmic affective-motor patterns as well. The Affect Diathesis Hypothesis may, therefore, involve a number of developmental levels. This possibility has important implications for early identification and preventive strategies.

Biologically based processing (regulatory) difficulties often contribute to, but are not always decisive in, determining relationship and communication difficulties. When problems are perceived early, appropriate professional help can, to varying degrees, teach children and caregivers how to work with the processing (regulatory) dysfunction, including helping the toddler connect affect to emerging action plans and associated relationship and communication patterns. Many children can become capable of forming warm relationships and, to varying degrees, climb the developmental ladder leading to language and thinking capacities.

There are many children who do not evidence autism but have developmental problems in which intentionality or purposeful action is difficult in its own right (e.g., severe motor problems). Such problems result in less practice in using intentional behavior and participating in intentional interactions. These children may, therefore, either have difficulty forming or may secondarily lose their ability to connect intent or affect to motor planning because they are unable to exercise this critical function (i.e., their impaired motor skills make purposeful action difficult). In these circumstances, creating purposeful interactions around any motor skill (e.g., head or tongue movements) may strengthen the affect-motor connection and reduce aimless, repetitive behavior, thereby facilitating problem-solving and thinking. Recent MRI studies suggest that practicing and improving motor skills may enhance the developmental plasticity of neuronal connections (Zimmerman & Gordon, 2000).

Also, as indicated, in our review of 200 cases of autistic spectrum disorders, although many children shared a primary deficit (i.e., connecting affect to processing capacities), their differences in the levels and strengths of developmental functioning in other processing capacities or "component parts" tended to determine symptoms and splinter skills, such as whether a child lined up toys (which requires some motor planning) or just banged them, or scripted TV shows (which requires some auditory memory) or was silent. It was also found that children with relatively stronger component parts tended to make rapid progress once they were helped to connect affect or intent to their other processing capacities. Children with weaker component parts tended to make more gradual progress and required specific therapies, such as speech and occupational therapy in an intensive manner, in order to improve the component part directly, as well as work with the affect-component part connection.

These observations are consistent with recent neuroscience studies suggesting that different processing capacities may compete for cortical access, depending on functional use (Zimmerman & Gordon, 2000). They are also consistent with neuropsychological studies of individuals with autism, but without mental retardation, that show that "within affected domains, impairments consistently involved the most complex tasks dependent on higher-order abilities" (i.e., concept formation, complex

memory, complex language, and complex motor abilities) (Minshew & Goldstein, 1998). Higher-level capacities tend to depend more on "meanings" which, in turn, depend on affective interactions with the world. Furthermore, these observations are also consistent with work on the shifts to a more complex central nervous system organization, including hemispheric connections that occur at the end of the first year of life and early part of the second year, just as the ability to engage in affect-mediated chains of social problem solving are on the ascendancy (Benson & Zaidel, 1985; Courchesne, et al., 1994; Dawson, Warrenburg, & Fuller, 1982; Sperry, 1985). Interestingly, many children with autistic spectrum disorders use peripheral vision, rather than central vision, to scan their environment (i.e., they don't look directly at caregivers but seem to look from the side). The neuroanatomy of the visual tracks is such that peripheral vision only requires one hemisphere, the left or right one, to function. Central vision, however, requires both hemispheres to function together (because some of the pathways cross over and others do not). It would be reasonable to explore the hypotheses that problems in integrating the two hemispheres, which facilitates long chains of reciprocal, affective interaction and integrated central vision, may contribute to autistic spectrum patterns. Work showing that the limbic system and hippocampus is developing, including forming cortical connections, at around 1½ years of age, is also consistent with these clinical observations on the increasingly purposeful and meaningful use of actions and ideas in the second year of life (Bauman, 2000).

Part II: Transformation of Affects in the First Three Years of Life

Historically, emotions or affects have been viewed in a number of ways: as outlets for extreme passion, as physiologic reactions, as subjective states of feeling, as interpersonal social cues (Young, 1943; Greenspan, 1997b). Beginning nearly six decades ago, the importance of emotions for aspects of learning was documented by psychoanalytic observers such as René Spitz and John Bowlby, who described the effects of emotional deprivation, and Heinz Hartmann and David Rappaport, who explored clinical and theoretical relationships (Spitz, 1945; Bowlby, 1952; Hartmann, 1939; Rappaport, 1960). Sibylle Escalona (1968) and Lois Murphy (1974) further explored affective development and described individual differences in infants and their relationship to psychopathology. Building on this work, Pediatrician T. Berry Brazelton systematized the observation of the infant's social and emotional repertoire (Brazelton & Cramer, 1990). In *Intelligence and Adaptation* (1979) and other works (Greenspan, 1989, 1992; Greenspan & Greenspan, 1985; Greenspan & Lourie, 1981; Greenspan & Wieder, 1998, 1999), Greenspan presented developmental observations and a model to integrate cognitive and affective aspects of the developing mind. In *The Growth of the Mind* (1997b), Greenspan showed how emotions create, organize, and orchestrate many of the mind's most important functions, including intelligence and emotional health. He further

showed that intellect, academic abilities, sense of self, consciousness, and morality have common origins in our earliest and ongoing emotional experiences and that emotions are the architects of a vast array of cognitive operations throughout the life span.

During the formative years there is a sensitive interaction between genetic proclivities and environmental experience. Experience appears to adapt the infant's biology to his or her environment (Hofer, 1988, 1995; Rakic, Bourgeois, & Goldman-Rakic, 1994; Greenough & Black, 1992; Weiler, Hawrylak, and Greenough, 1995; Holloway, 1966; Turner & Greenough, 1983; Turner & Greenough, 1985; Thinus-Blanc, 1981; Wiesel & Hubel, 1963; Singer, 1986; Hein & Diamond, 1983; Schanberg & Field, 1987). In this process, however, not all experiences are the same. As described in the prior section, children seem to require certain types of experiences involving a series of specific types of emotional interactions geared to their particular developmental needs.

The difficulty in connecting affect to motor planning and symbols discussed in the last section is only one part of a larger set of transformations of affect that depend on specific types of emotional interactions. To more fully understand the importance of affect in autism, and the development of intellectual and social skills, it may prove useful to explore a number of affective transformations during the first three years of life.

In the first year, affects become more complex. There is a transition from simple affective states like hunger and arousal to, by 8 months, complex affect states like surprise, fear and caution, joy and happiness, and enthusiasm and curiosity. As the child progresses, affects become more differentiated. Eventually, affects organize reciprocal interactions and problem-solving. Then they become symbolized. Eventually, it becomes possible to reflect on them. The transformations affects undergo can be described in terms of six core early organizations that give the organism its desire to act and underlie intelligence and emotional health (Greenspan, 1997b).

First, to attend to the outside world, and eventually to have joint attention or shared attention, requires affective interest in the world outside one's own body–in sights, sounds, and movements. Obviously, parents who provide pleasurable sights and sounds to a new baby will entice the baby into focusing on the world. Babies who are visually hypersensitive or auditorially hypersensitive will need a different type of enticement–a more soothing type–to take an interest in that outside world. Babies who are underreactive will require more animated interactions. Consider infants with low muscle tone who are underreactive and who grow up in institutional care. They often lose weight and some don't survive.

An early and continuing component of shared attention involves attending to the world outside one's own body with rhythmic, affectively-mediated perceptual motor patterns. For example, in the early months of life, babies can be observed to move their arms and legs in rhythm to their mother's voices (Condon & Sander, 1974; Condon, 1975). Soon they begin integrating what they hear and see (Spelke, 1976). By four to five months, one can readily observe synchronous movement in rhythm with mother's affective communication via her voice, facial expressions, or

body movements. As development proceeds, reciprocal gestural, vocal, and verbal communication generally occurs in an interactive rhythm. A consequence of this may be the observation that it's harder to remember or understand verbal phrases presented in a monotone than in an affective rhythm.

The second functional developmental capacity is engagement. For an infant to engage with a caregiver requires joy and pleasure in that relationship. When that's not present, children can withdraw and become self-absorbed. For children who have processing problems, it may be much harder to pull them into that joyful relationship. But in clinical work, we have not encountered many children evidencing autistic spectrum disorders who could not be pulled into greater degrees of relating through therapeutic work that works with their processing differences and relationships at the same time. Engagement and relating appears to be a very flexible capacity. While language and certain cognitive functions may improve slowly for some children, the capacity for warmth and relatedness seems to progress more readily.

The third functional developmental capacity is two-way purposeful communication. Two-way communication and affective reciprocity, which Peter Tanguay and Simon Baron-Cohen discuss (in this issue) obviously requires affect to provide the "intent." When an infant reaches for Daddy to take the rattle off his head or hand it back to him, or gets into a back-and-forth smiling game, one clearly sees affect (intent) guiding the interaction (i.e., the infant wants that rattle). Piaget thought means-ends relationships occurred at nine months with motor behavior (i.e., an infant reaching and pulling a string to ring a bell). But Piaget missed the role of affect. The baby's affective probe occurs much earlier than the motor probe. Causal affective behavior occurs earlier than causal large muscle motor behavior. First we see a smile begetting a smile, a frown begetting a frown. Later on, we see the baby reach for and give back objects. At this stage as well, the affect diathesis is occurring, now transforming relating into two-way, affective communication (rather than just joyful interest in the caregiver).

The fourth level of transformation occurs between 10 months and 18 months. It involves the development of a range of new capacities, all related to the toddler's ability to engage in longer sequences of affective reciprocal interactions with clear intent or problem-solving goals and the ability to perceive and interact in these larger patterns. This transformation enables the toddler to form a more integrated sense of self, integrate affective polarities, social problem-solve, and broaden visual-spatial and auditory processing abilities.

As indicated earlier, during this stage we often start seeing differences with some of the children who will be diagnosed with autistic spectrum disorders. Many of the children have relative degrees of mastery of the first three stages, but the fourth stage is more difficult. Now, the infant has to connect his affect to his motor planning and sequencing, as well as his emerging symbol formation. In order to be able to take a parent by the hand and walk him to the toy area and point to the toy that he wants, the infant has to have both a constant inner signal of intent or affect and a motor plan which is connected to it. If either one of those are problematic the infant may not be

able to implement complex, problem-solving, social behavior. As a child begins to imitate words ("Mom," "Dad," "go," "door"), those symbols or words have to be invested with affect to have meaning. The word "juice" only has meaning to the degree the child can invest the words with the many affective experiences that come to mean "juice," including the pleasure and image of drinking the juice.

Even grammar, which Chomsky and other linguists have assumed is innate, depends on affect and affective interactions to become functional. Children with autistic spectrum disorders frequently verbalize nouns in a repetitious way ("Door, door."). If the intervention can get them affectively interactive, however, they can often learn to use proper grammar. For example, a child is opening and closing a door. We get stuck behind the door. If they push us away, they are becoming purposeful. Purposeful, affectively-mediated behavior creates a foundation for the purposeful and meaningful use of words. Soon the same child is saying "go" while pushing us away. We may then say, "Where go? Where go?" We might further say, "Should we go away or stay? Away or stay?" The child may say, "Go away, go away." Now the child is using correct grammar. Noam Chomsky and his colleagues (Chomsky, 1966, 1980; Pinker, 1994) were mistaken when they thought that grammar was largely innate and that only experience in a very general sense was required to turn on the language switch. Grammar requires very specific types of affective experience. Affective reciprocity is needed to create purposeful action and then related purposeful symbols or words. The affect, by providing intent, enables the components of language to align (e.g., "open door" versus "door, door, door."). Many investigators may have missed the importance of affective reciprocity because it occurs routinely with most infants and toddlers and their caregivers.

At the fourth level of transformation many complex social problem-solving interactions, in addition to involving vocalizations and words, involve visual-spatial patterns. Johnny can find his mother in the other room because between 12 months and 18 months, he has learned to construct a visual-spatial road map of the house. This road map allows him to do what Margaret Mahler described as "separation-individuation" (Mahler, Pine, & Bergman, 1975). He explores independently, but then comes back to his base of security for "refueling." Mahler, however, did not realize, he could use his visual-spatial processing and auditory processing to refuel from afar. He can have his security blanket from across the room, either by looking at Mom and communicating with looks or other gestures or by hearing her voice from another room and figuring out where she is based on her voice. If his visual-spatial or auditory processing is weak, or the affect system is not investing his visual-spatial or auditory processing, however, this emerging capacity will not properly form.

Simon Baron-Cohen (in this issue) describes the folking of cognition and divides children into the physicists (interested in the mechanics of things) and the novelist group (interested in people and emotional interactions) in terms of relative cognitive and social strengths and weaknesses. What happens, however, when a child has strong visual-spatial and mechanical skills and invests that system with a lot of pleasurable affective experience with primary caregivers? Do they become both a physicist and a poet (i.e., a physicist with a warm heart, big smile, and feel for people)?

One possibility is yes. We have observed that children who are able to use strong visual-spatial systems in reciprocal affective interactions often use physical metaphors to deal with emotions. They're not the kind of people who are afraid of affect or feeling. Quite to the contrary, they talk about their feelings, but often use physical images to communicate ("I feel as angry as a four megaton nuclear blast!").

The affect diathesis hypothesis suggests that affect invests not simply the capacity for complex interactions to give meaning to sounds, words, and behaviors, but also invests processing capacities, such as motor planning and visual spatial processing. It gives meaning and functional range to these capacities. Individuals can then use different processing capacities in a variety of ways–not just to solve an equation, but also for social, personal problem-solving (e.g., figuring out how to work the crowd politically).

It may not appear obvious how to affectively interact through the visual-spatial system. But, playing chase games, hide-and-go-seek games, and treasure hunts are good vehicles for bringing visual-spatial capacities into an affective context, as are discussions involving how angry or loving we feel on a 1–10 scale. This is exactly what we do with some children who need more work "affecting" their visual-spatial and motor planning systems. The stage for these types of games are often set earlier in the third and early fourth stages, with peek-a-boo and other types of play that combine pleasurable affect, affective expectation, and visual-spatial processing.

In this fourth stage, the child is also beginning to integrate affective polarities. Early on, infants tend to have extreme affect states–all happy or gleeful or all sad–but by 18 to 19 months we see children begin to shift affect states more readily and actually integrate affect states such as happiness and sadness, anger and closeness. They can be angry and then seem to want forgiveness and make up. When playing with a 13-month-old child, it feels like if he were angry and had a gun, he very well might pull the trigger. With the 18-month-old, it feels like he integrates his caring and anger. He might look mad and feel connected and warm at the same time. One can often feel the quality of these affect states when playing with infants and toddlers at different ages.

Complex affective patterns emerging during this fourth transformation lead to patterns of affective expectations. A toddler purposefully behaves cooperatively, hams it up and acts funny, or becomes mischievous, all in relation to specific internal states. A child also anticipates what Daddy's going to do next when he comes home. He looks at his face and if it's angry, he hides behind the door. If he looks like he's feeling warm and will be nice, the toddler will run up and flirt with him. The toddler can anticipate the "other" as well as the "self" in terms of affects and behaviors. This capacity sets the stage for many of the "theory of mind" tasks that Simon Baron-Cohen describes (this issue).

At the fifth level, transformations involve the affect system investing ideas. For example, in pretend play, affects or desires drive the theme (dolls hugging or kissing) as well as functional language ("I'm hungry," "I'm angry," "Give me that." "Look! I want to show you something."). Functional language, whether it's on a need basis (Give me juice."), or at a collaborative "show you this or that," or sharing opinions

"I didn't like that" basis, is very different from simply labeling objects or pictures. Here is also where IQ tests fall down. IQ tests don't discriminate well enough between the different uses of ideas and language, such as between pragmatic language or creative and abstract thinking and simply using language to label objects or for rote, memory-based problems.

Many researchers use IQ tests to create comparable groups. For example, children with autism and without autism are matched on IQ tests and then given theory of mind tasks or other cognitive tasks. The goal is to see if the children with and without autism differ on theory of mind tasks when they have similar IQs. If they differ, it would suggest that theory of mind tasks distinguish autistic from non-autistic children. But, there is a problem with this approach. Even though the groups have similar IQs, they may not be the same in terms of their intelligence. Their intelligence patterns may be quite different. For example, they may have very different pragmatic language levels and very different abstract reasoning skills. In these studies, we must control for pragmatic language and abstract thinking (i.e., true intelligence), not IQ, if we want to get at the essence root of how certain cognitive capacities, such as those involved in theory of mind tasks, are related to autistic spectrum disorders. In other words, theory of mind capacities may relate more to the level of pragmatic language and abstract thinking than to whether a child does or does not have autism. Only proper control groups can tease out this distinction.

Research on theory of mind tasks and other cognitive or perceptual capacities, such as the ability to discriminate facial expressions to be cognitively rather than affectively oriented. For example, asking a child to figure out how another child is feeling in the middle of a power struggle, in heated debate, or in situations that might lead to disappointment or sadness, would get at his ability to understand someone else's true emotions in an emotional context. Figuring out what someone else will see in a room, on the other hand, or identifying pictures of facial expressions are more cognitive and perceptual tasks. These areas of research have led to cognitively oriented interventions. These interventions do not work enough at the level of affective interchanges. The importance of engaging in long chains of reciprocal affect cueing in order to establish a sense of self and a sense of other (through these back-and-forth affect signals) is often overlooked in many of these interventions. The cognitive procedures utilized in such interventions are many steps removed from the affective interchanges that are necessary to establish the compromised capacities.

For example, there has been a great deal of interest in children with autistic spectrum disorder evidencing difficulty in discriminating facial expressions of different emotions. Based on this research, children who have trouble interpreting the emotional expressions of others are "taught" about emotional expressions by looking at pictures of people with different facial expressions or through identifying emotional expressions of others in structured exercises. This conscious cognitive appreciation of a picture is, however, not what's missing. What's missing is the intuitive, almost automatic sense of another person's affect. This is the capacity one uses in appreciating a friend's subtle, emotional state or in working the crowd at a cocktail party.

In other words, the understanding of the other person's emotions is experienced very rapidly through a personal, visceral, emotional reaction. In fact, we can often respond to the person's affect before it even consciously registers. Thus, we flirt back, look puzzled or grimace in anger as part of our intuitive, affective response. Once we have experienced, at the intuitive level, the other person's emotional signal, we can also reflect on it in a conscious and deliberate manner. We may say to ourselves, "they look sad" or happy or angry. In making these determinations, however, we are relying on our own affective response, not simply on the other person's facial expression. Also, as indicated, in the ordinary course of events, such as working the crowd at a cocktail party or negotiating peer relationships on the playground, there are many affect signals being exchanged in a brief period of time. If a child or adult consciously tries to figure out each separate one, they will be doomed to failure and confusion. Therefore, the only way to help a child with problems reading affect signals is to provide him or her extra practice in experiencing and reading those signals (i.e., in social situations involving lots of reciprocal, affective interactions, initially with one-on-one caregiver, child, and peer play and gradually in more complex situations). The "practice" needs to involve the personal inner experiences of someone else's affect, as well as one's own, in a series of reciprocal interactions. Similarly, children who have theory of mind problems are often provided with cognitive exercises involving figuring out other people's perspectives, rather than working at the primary level of affective signaling, which is often compromised and at the core of these children's problems.

Some may believe that children with autism or Asperger's Syndrome are not able to learn to feel their own and someone else's affect and, therefore, can only learn to read facial expressions through pictures or perform theory of mind tasks in a conscious, deliberate manner. We have found this assumption not to be correct. With a program focusing on relating and affect cueing, the majority of children made progress in this capacity (Greenspan & Wieder, 1997).

In general, the missing piece in many intervention programs is a lack of understanding of the developmental steps involved in acquiring certain cognitive, social, and emotional skills. By understanding these steps, which often involve transformations of affect, intervention strategies can help the child master the critical foundations for cognitive and social skills.

At the sixth level of transformation, a child builds bridges between affectively meaningful ideas. Establishing reality-testing, a symbolic sense of self, and moving back and forth between fantasy to reality depends on reaching this next level. For example, critical to establishing reality-testing (which is the basis for later abstract thinking) is an affective "me" intending to do something with an affective "other." There has to be an interaction involving affect between the "me" and the "other" to establish a psychological boundary (i.e., an affective sense of what's "me" and an affective sense of what's "outside me"). That boundary doesn't come out of reading books or out of doing puzzles. It comes from interactions involving the exchange of affective gestures and symbols. It comes out of interactions such as "I want this." "No, you can't have it," or "Yes, you can." In addition, these interactions must be part of

a continuous flow of back-and-forth affective gestures. Islands of affective interactions followed by self absorption leads to an "in and out" affective probe or rhythm with the external world (reality). A stable sense of reality requires a continuous interactive relationship to the significant "others" in our lives. Abstract and inferential thinking grows from a solid reality boundary.

A stable reality boundary also allows empathy to develop. A child can project a "me" into a "you" and figure out how "you're" feeling to the degree that a child has established a separate sense of "me."

In this context, abstract thinking, empathy and theory of mind tasks are extensions of the stage of building bridges between affective ideas. In addition to affective interactions, the child's individual differences in processing capacities (i.e., visual-spatial processing, motor planning, auditory processing) will contribute to these advanced mental capacities and they have to be taken into account in considering these capacities.

For example, consider the theory of mind task Simon Baron-Cohen (this issue) has described where the child is looking into the basket and the other child has to describe what he's doing. In a task like that, if we show one child a diagram, he'll get it and tell you exactly what the other child is doing. But if we describe it in words to that child (not visually, but auditorially). "Gee, a child is looking in, what is he seeing?" The child won't get it. Another child, however (also with an autistic spectrum disorder), may be just the opposite–stronger with the verbal than the visual. The processing capacity is, therefore, a very important component of a child's ability for, and pattern of, abstract thinking and empathy. Also, if a child has sequencing problems and there are five steps in the problem, the child may get lost simply because of the sequencing challenge, not because of an inability to project himself into someone else's shoes. Therefore, higher levels of abstract thinking, including theory of mind tasks, may occur in certain processing modalities and not other modalities and with regard to certain affect realms and not others.

In summary, we've described the affect transformation that occurs in each of the six functional developmental capacities. Affect is responsible for helping the child go from simple interest in the world all the way up through social problem-solving (and procedural knowledge). It enables a child to progress through procedural knowledge up to symbolic knowledge. It gives meaning to what the child hears and how he processes visual-spatial information and sequences motor actions.[1]

[1] The importance of genes is often cited to minimize the role of affective interactions and the environment, but the role of genes is more complex than is often acknowledged. Consider a very interesting study on schizophrenia. Investigators looked at identical twins that shared a placenta and identical twins that did not share a placenta. The concordance rates of the identical twins that shared a placenta was very high in keeping with the literature on the genetic basis of schizophrenia. The concordance rates of identical twins that did not share a placenta were very low close to the rates for dizygotic twins (Davis, Phelps, & Bracha, 1995). Therefore, unless we control for the sharing of a placenta, we won't know how much the genes contribute and how much the intrauterine environment contributes. This article was published in *Schizophrenia Bulletin,* but has not been sufficiently used in behavioral genetics research.

Distinguishing the Capacity to Engage from the Capacity for Exchanging Affective Signals

In discussing the different stages of development, it's important to emphasize the difference in the level of affective transformation involved in patterns of simple engagement and relating versus reciprocal affective signaling. Many children with autistic spectrum disorder are capable of deeply engaging and forming patterns of warmth, trust, and dependency with a great deal of pleasure and joy. Some of these children will have varying degrees of difficulty, however, in developing ongoing, reciprocal, affective interchanges. Even if they are warmly and deeply engaged, it's especially difficult for some children to develop a continuous flow of reciprocal, affective interactions.

There are many reasons for this difficulty, including biologically based processing difficulties involving motor planning, visual-spatial processing, auditory processing, or sensory modulation. Motor planning problems, for example, make it hard for the child to sequence and, therefore, engage in a multi-step, affective interactions. Visual-spatial processing difficulties make it hard for the child to construct larger spatial patterns and, therefore, picture and negotiate a multi-step, affective sequence leading to a goal. Sensory reactivity difficulties will also make it hard for children to participate in long chains of reciprocal, affective interactions. They become overwhelmed with catastrophic affects, with short bursts of intense reactions rather than modulated, long chains of interaction. The distinction between the ability to engage and the ability to engage in long chains of affective, reciprocal interactions is especially important for children with autistic spectrum disorders. We hypothesized that children with autistic spectrum disorders have a biologically based deficit in the capacity to connect affect to motor planning and sequencing and, therefore, are unable to enter into long chains of reciprocal, affective interaction. They also often have motor planning, visual-spatial, language processing, and sensory reactivity problems further intensifying this basic difficulty.

Yet, many children with autistic spectrum disorders have, or are capable of relatively quickly forming, patterns of engagement that involve a few circles of back-and-forth affective interchange. They are capable of engaging with pleasure, warmth, and joy. They're, therefore, capable of the earlier levels of affect transformation, involving basic engagement, even though they have difficulty with forming reciprocal affective interchanges. The basic capacity to love, experience intimacy and deep dependency is relatively stronger than generally acknowledged. It is the capacity for reciprocal, affective gesturing (i.e., the ability to negotiate within a loving relationship) that's more problematic.

Many of the children we've worked with start off with the capacity for deep pleasure. They enjoy cuddling, being held, and show joyful smiles when their caregivers engage them in a warm pattern of relating. Other children appear to be more avoidant, self-absorbed, or affectively constricted in terms of showing joy and pleasure. Often these children can be helped to enjoy fundamental relating in a deep and satisfying manner, once we figure out their sensory processing and motor profiles. For example, some of the children are very sensory over reactive and, therefore,

uncomfortable with closeness involving touch or high- or low-pitched sounds. When the sensory environment is tailored to their unique profiles, these children begin evidencing enormous pleasure in relating. Children who have difficulty with motor planning become more deeply engaged when their caregivers learn how to position themselves in a way that makes the motor planning challenge simpler. In other words, the child who only has to reach out and hug or is helped to be in pleasurable sensory contact so he can feel where his caregiver is, finds it much easier to reach his goal of closeness with mother and father than the child who has to sustain focus and interest through four or five independent actions in order to reach mother or father.

In our review of 200 cases (Greenspan & Wieder, 1997) of children who received a comprehensive, intensive program of intervention, we found that the first gain the vast majority of children made was in the capacity to engage with warmth and pleasure. The capacity for engaging with warmth and pleasure occurred before gains in language skills, cognitive skills, or motor skills. Engaging appeared to be the aspect of functioning that was the most quickly responsive to the intervention efforts.

The observations that the capacity to engage responds most quickly and that many children diagnosed with autistic spectrum disorders can show a lot of joy and pleasure even before an intervention program has begun suggests a possible misconception about autistic disorders. Often, the capacities for affective reciprocity and affective engagement are believed to be part of the same process and children with autism are, therefore, viewed as less capable of love and intimacy than others. But, affective interactions are fundamentally different from the capacity to form a basic relationship characterized by pleasure and joy and, ultimately, a sense of trust and intimacy.

Many of the children we've been following for over five years (some for over 10 years) evidence patterns of closeness and warmth that are both joyful and deeper, in many respects, than typical children their age are able to show. We have observed that many evidence a great deal of warmth and closeness for their age group. It's not surprising that these children can evidence intimacy because their parents have been spending extraordinary amounts of time with them in a warm and nourishing way that is sensitive to their processing profiles. Children without challenges whose parents are very available also form deep, satisfying patterns of closeness, warmth, and intimacy.

As indicated, historically, however, it has often been thought that children with autistic spectrum disorders have a biologically-based deficit in their ability for warmth and closeness (i.e., the capacity for a deep sense of love). It's been thought that this is part of their difficulty with forming patterns of social interaction. It's been believed that they experience the type "autistic aloneness" that Kanner described in his classic descriptions (Kanner, 1943). Even though many studies have refined Kanner's original observations and different degrees of social relating have been described and incorporated into diagnostic criteria for children with autistic spectrum disorders, nonetheless, the perception persists (and continues to a partial degree even in the most recent diagnostic criteria) that children with autistic spectrum disorders

are less able to engage with depth and warmth and with a deep, abiding sense of love than other children who don't have these developmental challenges.

Our clinical observations would suggest that this common belief is simply incorrect. If we distinguish a child's capacity for deep, joyful relating from the capacity for affective, reciprocal interchanges, it is possible to observe that many children with autistic spectrum disorders are capable of the full range of warmth, love, and closeness. This intimacy is relatively easy to observe in families who focus a great deal on promoting relaxed intimacy by observing spontaneous relating for long periods of time (hours, not minutes) and attending to all the subtle ways the children have of showing their intimacy. In our review of 200 cases, over half the children evidenced a deep rich capacity for intimacy and over 90% showed a continuing growth in this pattern (Greenspan & Wieder, 1997).

One may expectedly raise the question: why do many children with autistic spectrum disorders appear to spend so much time avoiding relationships or with constricted affect or in states of self-absorption? Why don't many show a great deal of obvious pleasure and joy in relating to others? The answer to these two important questions is that children with autistic spectrum disorders who are capable of enormous warmth, joy, and deep relating can withdraw from relationships if the relationships are experienced as aversive or painful or simply not pleasurable. This often happens, not because the children are incapable experiencing joy or because the parents are not extraordinarily loving,but because caregivers are not sufficiently helped to figure out the unique sensory processing profile of the child so that they offer patterns of relating in a way that is pleasurable and deeply satisfying.

Some of the children have sensory processing patterns that are not so challenging and their caregivers find it relatively easy to approach and entice them into warm, nurturing patterns of relating. Other children, however, have complicated sensory patterns where caregivers require assistance. If this assistance is not forthcoming, children can pull away from the very relationships they might otherwise enjoy and seek. In addition, if the children are not helped to progress into reciprocal affective interactions, it's hard for them to negotiate intimacy and, as indicated, they are more likely to experience intense, catastrophic affects.

This distinction between the child's capacity to engage and the child's capacity for affective reciprocal interchanges is being emphasized because it clarifies the misperception about children with autistic spectrum disorders mentioned above, that is, that this group of children somehow loves less deeply or less profoundly than other children. This misperception, as is well known, can easily become the basis for a self-fulfilling prophecy if caregivers are discouraged from trying to find ways to draw their children into deeper patterns of intimacy. Simply not encouraging caregivers to explore this capacity can be a way of it becoming a prophecy come true.

There are, in fact, two misperceptions that need to be avoided. One is that the children who have a more challenging time learning to relate because of their biological differences, (such as sensitivities to sound or touch or language problems), are unable to learn to relate warmly through the availability of special interactions geared to their unique developmental profiles. The other misperception, equally worrisome,

is that caregivers who construct special patterns of care that woo their child into relationships are somehow contributing to the causes of their children's problems. What we're saying here is that many children, especially those with autistic spectrum disorders, have biological differences that express themselves in the way the child processes sensations and organizes and plans responses. These biologically based processing differences can make the expectable milestones of learning to relate and communicate very challenging and, in some cases, possibly even impossible given current knowledge. The caregiving environment, however, while therefore not the cause of the child's biological challenges can be a vital part of the process that helps the child master, to varying degrees, aspects of his or her biological challenges. We have found that the caregiving environment can be especially vital in helping children with autistic spectrum disorders learn to engage with greater degrees of warmth and intimacy if their caregiving overtures are tailored to the child's developmental profile. Therefore, while not being the cause of the problem, the caregiving environment can be an important component of a comprehensive approach to intervention. Perhaps the best way to conceptualize the challenges to forming relationships for children with autistic spectrum disorders is as follows. Due to their unique sensory processing profiles, the negotiation of a deep sense of intimacy is a complex and subtle process. The capacity appears to be there, but needs to be met with caregiving overtures that are sensitive to the child's unique processing patterns. It is very easy for children with challenging processing profiles to respond negatively to even simple environmental challenges. Children without these processing challenges might easily have a more flexible capacity to engage others even under difficult conditions. The children with complex processing profiles are, therefore, extremely sensitive to the subtleties in their environments and can easily regress or form patterns of avoidance and self-absorption. At the same time, however, they can be drawn into wonderfully, deep, and satisfying patterns of closeness and intimacy. Parents are in a unique position because of their long-term relationship to the child to foster this intimacy and engage in long sequences of pleasurable affective interactions. Children's capacity for intimacy, coupled with their sensitivities, in fact, suggest a need for nurturing, intimate care that is especially deep, flexible, and persistent.

Part III: The Role of Emotions in the Development of Intelligence and Social Skills

If each of the transformations just described occurs, affects give rise to higher and higher levels of intelligence and emotional health. The emotional interactions described in the prior section, therefore, are not simply responsible for early social, cognitive, and language capacities, but for higher level intellectual and social capacities as well. A continuous flow of emotional interactions between children and caregivers is especially important for the development of the highest levels of human thinking involving self-reflection, making inferences, creating new problem-solving strategies, having empathy and insight, and regulating mood and

behavior. This section explores the connection between affect and the capacity to regulate behaviors and construct the highest levels of intelligence and social interactions. In doing so, it shows why interference in the development of affective interactions, as seen in autism, is associated with a large range of cognitive, behavioral, and social deficits.

Our awareness of the importance of affect for higher level cognitive and social skills was heightened when we observed and talked with children with strong self-awareness and reflective thinking skills, and realized that most of them also showed positive self-esteem, demonstrated a capacity for moral judgment, were analytical in their reasoning, and did well in school and with their peers. We sought to understand what helped them become this way, and, therefore, spoke with them and with other children who had opposite personal characteristics. We learned that what we commonly label as intelligence, social skills and morality was based on the child's ability to use his affects to think, which, in turn, is supported by the six types of emotional interactions, described in the prior section, that are negotiated during the early years of life.

For example, when we asked a group of eight-year-olds abstract questions, such as what they thought about justice or fairness, their comments were very revealing. Some of the children responded with a rote listing of people who behaved "fairly," such as a particular parent or teacher or television character. However, others gave far more reflective answers, along the lines of "Well, when I hit my brother after he hit me it was unfair for me to be punished, but when I hit him first it was fair for me to get a punishment. If I bump into him by accident, it's not fair to be punished, but if I do it on purpose it is fair."

Not surprisingly, when we looked at the two groups of children more closely, those who gave us the rote list tended to be the ones who were experiencing more problems in their relationships and in their schoolwork. The children who gave us more creative and reflective responses tended to do better in these social and intellectual areas.

We then took a second look at the more reflective responses and discovered that they had two components. This was true whether our test question focused on fairness or any other abstract quality, such as honesty, friendship or freedom. The first component was that the children's responses always started off with a personal anecdote, an account of *lived emotional experience*. The second component was that the children put these experiences with abstract concepts into some sort of analytic framework and context.

When we later asked this same question of adolescents, they were able to list more categories (five different types of fairness, for example) and supplied an even more worldly-wise analytical framework. But in every instance, and at every age, two components were evident in the more sophisticated replies: lived emotional experiences and a framework, or context. The children who didn't have a lot of lived emotional experiences–due to either nurturing or biological challenges that interfered with interaction, such as difficulties with language, for example–tended to be the ones who responded with concrete lists, rather than anecdotes. Interestingly, we

found that the most effective way to teach such children analytic reasoning or thinking was by creating opportunities to have more "lived emotional experiences" and to reason about them. We observed that even children with severe developmental problems, including autistic patterns, could become more creative and reflective when they were exposed to more one-on-one interactions with their caregivers.

It thus became increasingly clear that certain types of emotional experiences seemed to be necessary for generating abstract ideas or thinking. This concept had been overlooked, because for many hundreds of years it has been a given in Western culture that emotions are separate from intelligence. We have commonly assumed that emotions are experienced as bodily reactions or passions that lead us to do irrational things; and more recently we have also viewed them as the cues that enable us to function socially. But in these conceptions of emotions, they are viewed as fundamentally different from intelligence, which has been considered to be the logical part of our minds that helps us be rational and make sense of the world.

Our new observations suggest that emotional interactions play a far more critical role in intellectual functioning. They can help us go beyond Howard Gardner's important idea of separate, multiple intelligences (1983), or Antonio Damasio's research on the brain which suggests that emotions are important for judgment but somehow separate from academic capacities or overall intelligence (1994). Even Jean Piaget, the pioneering cognitive psychologist, overlooked this vital connection. Piaget observed that when an eight-month-old is accustomed to pulling a string that is attached to a bell and to hearing the bell ring in response, he will eventually stop pulling the string if it is detached from the bell. To Piaget, this sort of behavior revealed that the child is a causal thinker, because he pulls the string only if it leads to his hearing the sound of the ringing bell. Although Piaget's observations were accurate, he did not realize that this was not the child's first opportunity to learn about causality. A baby's first lesson in causality occurs many months earlier, when he pulls on his mother's or father's heartstrings with a smile that brings a responsive smile of delight or some other joyful expression to his parent's face. The child then applies that emotional lesson to the physical world of pulling strings, banging objects and the like.

At each succeeding stage of development, we have found that emotional interactions like a little baby's smile leading to a hug enable the child to understand how the world works, and eventually to think, solve problems and master academic challenges. Emotions are actually the internal architects, conductors, or organizers of our minds. They tell us how and what to think, what to say and when to say it and what to do. We "know" things through our emotional interactions and then apply that knowledge to the cognitive world.

Consider how a young child first learns how to say "Hi!" as he greets other people. A toddler doesn't memorize lists of appropriate people to say hello to. He merely connects the greeting with a warm friendly feeling in his gut that leads him to reach out to other people's welcoming faces with a verbalized "Hi!" If he looks at them and has a different emotional feeling inside, one of wariness, he's more likely to turn his head or hide behind your legs.

It is his feeling, or affect, that triggers the child's decision over whether or not to greet a stranger. We encourage this kind of "discrimination" because we don't want our children to say "Hi!" to a menacing stranger in a back alley. We want them to say hello to nice people like Grandma. If the child won't say "Hi" to his grandmother, it's because he's not experiencing a warm feeling inside. If we can teach Grandma how to evoke that warm, fuzzy feeling inside her grandchild, she'll eventually get a friendly "Hi!" back in response. Similarly, if a child learns to greet those people who make him feel warm inside, he will quickly say "Hi!" to a friendly teacher or to a new playmate. He carries his emotions inside him, helping him to generalize from known situations to new ones, as well as to discriminate, or decide when and what to say.

Not only thinking grows out of early emotional interactions; so does a moral sense of right and wrong. The ability to understand another person's feelings and *care* about how he or she feels can only arise out of a series of nurturing interactions. We can only feel empathy if someone has been empathetic and caring with us or else we would not know what the feeling of empathy felt like. Even something as purely academic and cognitive as math and concepts of quantity is based on early emotional experiences. "A lot" to a three-year-old is more than he wants; "a little" is less than he expects. Later on, numbers can systematize this feel for quantity. Children with math blocks can be helped to become solid students by going back to the early emotional roots of learning about quantity. Similarly, concepts of time and space are learned by the emotional experiences of waiting for Mom, or of looking for her and finding her in another room.

Words also derive their meaning from emotional interactions, as our example of fairness illustrates. A word like "justice" acquires content and meaning with each new emotional experience of fairness and unfairness. Comprehension of a word like "apple" is based on numerous emotional experiences involved in eating one, throwing one and giving one to your teacher, in addition to its obvious physical characteristics of redness and roundness. As we showed earlier, even our use of grammar, which the noted linguist Noam Chomsky and others believe is largely innate and only needs some very general types of social stimulation to get going, is based in part on very specific early emotional interactions.

To provide the optimal quality and quantity of the types of emotional interactions requires, however, not simply caring loving adults, but caring loving adults who are consistent in the child's life and who have time to spend with the child each day. Ongoing empathetic caring is especially important for qualities of the human mind that can only be learned through ongoing experience—compassion through compassion, and intimacy by experiencing intimacy. These capacities are different from motor, language or cognitive skills. They require consistent care giving of one or a few stable caregivers who are there for years in the child's life. For example, children can learn altruistic behaviors in an impersonal way by copying or learning rules (i.e., to do "the right thing"), but truly caring for another human being only comes through experiencing that feeling of being cared for oneself. It is a self-evident truth that to feel an emotion we have to experience that emotion in an ongoing relationship. We can't experience emotions that we have never had, and we can't experience the

consistency and intimacy of ongoing love unless we've have had that experience with someone in our lives. For some it may be a grandmother or an aunt, or it may even be a neighbor, but it must be there. There are no shortcuts to life's most important experiences.

Therefore, family patterns that foster healthy relationships are essential for healthy emotional and intellectual growth. In one study we found that families with four or more risk factors interfering with relationships were 20 times more likely to have marginal IQ scores and behavior problems at age four. This pattern continued and was again documented when the children were 13 years old (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1986; Sameroff, Seifer, Baldwin, & Baldwin, 1993).

Emotional Interactions and the Regulation of Behavior, Feelings, Moods, Problem-Solving, and Thinking

The basic feature of caring, caregiver-infant relationships, back-and-forth affective interactions within which we read and respond to the baby's signals and the baby reads and responds to our affective overtures, is responsible for a surprisingly large number of vital mental capacities.

For example, the child eyes the red rattle and parent holds it up and the child reaches for it, takes it, the parent holds his hand out and the child puts it back in the parents hand, there is a big smile, the parent smiles back, the child makes some sounds, the parent makes some sounds back. We have an interactive dialogue involving sounds and gestures and emotional expressions, such as big smiles, all happening in a rapid back-and-forth set of exchanges. As described earlier, this rapid back-and-forth set of exchanges (i.e., "opening and closing circles of communication" or "reciprocal affective interactions") is the beginning of learning to think purposefully or causally, "I can make something happen." It also teaches babies how to take initiative (you do something and it makes something happen, your smile gets a smile from mommy or daddy). The infant is beginning to have a sense of purpose and will and, very importantly, a sense of "self" (it's "me" making something happen, "me" getting that smile or getting that little red rattle with reaching out "my" hand). The sense of self, will, purpose, assertiveness and the beginning of causal logical thinking all occur through long chains of reciprocal affective interactions.

But something else also occurs as a product of these back-and-forth interactions that has not been sufficiently described before. Through these reciprocal affective interactions the child learns to control or modulate his behavior and his feelings. We all want children who are well regulated or modulated, that is, who can be active and explorative some of the time, concentrate and be thoughtful and cautious other times, joyful yet other times. We all want children who can regulate their emotions in a way that is appropriate to the situation and also regulate their behavior in a way that is appropriate to the situation. We all admire adults who are able to do this. But how do we learn to control or regulate our behavior and moods?

What is the difference between a child who can regulate their mood, emotions and behaviors and a child who can't and where the slightest frustration feels catastrophic, as though the world were going to end, or where anger is enormous and explosive, or sadness seems like it will go on for ever and ever? What is the difference between these extreme and almost catastrophic emotional reactions and the ones that are finely regulated and responsive to the situation at hand? (Sometimes there is sadness, sometimes joy, sometimes even anger.)

The difference is in the degree to which the child learns and masters this important capacity for rapid back-and-forth exchanges of emotions and gestures through these reciprocal interactions.

When a child is capable of rapid back-and-forth interactions with his caregiver, he is able to negotiate, in a sense, how he feels. If he is annoyed, he can make a look of annoyance or a sound or hand gesture. Mother may come back with a gesture indicating "I understand" or "OK, I'll get the food more quickly," or indicating "Can't you wait just one more minute?" Whatever the response is, if it is responsive to his signal he is getting some immediate feedback that can modulate his response. The anger may be modulated by the notion that mother is going to do something, even if she can't do it immediately. Just the sound of her voice signals to him that she is getting that milk bottle ready and it's coming real soon. Or his pushing the bottle away with an angry glance at her and her putting her hand out to take it from him is another way he knows that his anger is being responded to. Similarly, when his big smile gets a smile back he knows his joy is being responded to. He gets a sense that he can regulate his emotions through regulating the responses he gets from environments. He gets the quick sense that he and his caregivers are in this pattern where they are regulating one another, where the back and forth is a finely-tuned nuance system involving lots of feedback.

We now have a fine-tuned system rather than a global or extreme one. The child doesn't have to have an extreme tantrum to register his annoyance, he can do it with just a little glance and a little annoyed look. Even if mother doesn't agree with him or can't bring that food right away, nonetheless she is signaling something back which gives him something to chew on while he is deciding whether to escalate up to an even more annoyed response if she doesn't move fast enough. This is a system of steps. Even if he does escalate up to a real tantrum, he is not going from 0 to 60 in one second. More often than not, however, his mood and behavior will be regulated as a part of this back-and-forth interaction. All the different feelings, from joy and happiness to sadness to anger to assertiveness become a part of fine-tuned regulated interactions where a subtle reciprocal pattern comes into play rather than an all-or-nothing one.

Why would we have an all or nothing pattern if we didn't have this chain of back-and-forth interactions? What happens when a child doesn't have access to sufficient reciprocal interactions? Perhaps he can't gesture or signal well or has an unresponsive parent who is not signaling back or has a parent who is too intrusive and anxious and can't respond to his signals or is too self-absorbed or depressed to respond. For any one of these reasons, we may see a compromise in this fine-tuned interactive

system involving the regulation of mood, feelings and behaviors and instead see extreme or catastrophic type reactions.

When the child who is not learning how to engage in finely-tuned back-and-forth interactions where there is lots of feedback has an emotion, he doesn't implicitly expect it to lead to an immediate response from his environment. The emotion consequently exists somewhat in isolation. Without the modulating influence of a reciprocal response, the feeling may simply get more intense. The child is left to using more global responses of anger or rage, fear or avoidance, or withdrawal or self-absorption. Very young infants are more prone to these extreme reactions in the early months of life. When they cry, they cry very hard and loud because they are very frustrated until we help settle them down. When they cry with anger we can feel their rage in their vocal tone until we soothe them. These extreme emotional reactions have certain similarities with what has been described as flight/fight reactions, global reactions of the human nervous system in comparison to finely-nuanced back-and-forth interactions with finely regulated emotions and behaviors. Children are not limited to flight/fight reactions. They can have a variety of global reactions including avoidance, withdrawal, self-absorption, and fear, rage, or impulsivity.

The child graduates from global responses in the early months of life to nuanced fine-tuned reciprocal interaction patterns (from about 3 months to 9 or 10 months). By 9 or 10 months these finely-tuned reciprocal patterns become well established and then become more complex, goal-directed, and problem-solving between 10 and 24 months. By the time the child is talking up a storm at age 2 and $2\frac{1}{2}$, he already has the capacity to be involved in long chains of back and forth interactions (back-and-forth reciprocal interactions) involving different emotions and behaviors. If all has gone well, they are already part of a nuanced, finely-tuned system where mother's serious glance signals limits to the child; where her joyful expression signals permission for the child to be more expansive and try new things; where the child's annoyance signals the parent to have a quizzical look of "what can I do to help you out?" and so forth. These series of actions and interactions involving emotions, mood and behavior help the child to develop a finely-tuned, subtly-nuanced regulatory capacity, rather than to retain and exaggerate early global catastrophic reactions.

What we have been describing is especially important when we see children who are operating in a catastrophic or extreme manner, that is, extreme meltdowns or tantrums, or getting carried away with excitement, anger, sadness, or even depression. Often, these extreme reactions will mean that not only are things happening at the moment to cause anger or despair, but that the reactions are out of proportion to the events of the moment, suggesting that some parts of the child's feelings, mood and behavior didn't have a chance to become regulated through long chains of back-and-forth reciprocal interactions.

For most families it's easier to get involved in back-and-forth negotiations around certain behaviors and feelings than others. Some children and caregivers develop long chains of regulated reciprocal interactions around assertiveness and anger quite

well, but don't do it as well around sadness or sense of loss. Other are just the reverse and are better around sadness and loss and issues of intimacy and warmth, but are very anxious and therefore don't interact very much or don't interact in a finely-tuned nuanced way around assertiveness or anger. In this context, it is not surprising that as children become older they have different modulation capacities for different feelings. As adults many of us are better with one set of feelings than another set of feelings in the way we regulate our moods, have a sense of being able to negotiate feelings with others and understand them in ourselves.

As children learn to regulate their behavior and feelings as part of long chains of back-and-forth interactions they can use this skill to get to the next level where they can problem-solve with the feelings and try to change what's happening in their environment. If it is unpleasant, they can do things to change the situation and the feeling. If it is a pleasant feeling, they can change their environment to bring on more of those events. By 18 to 20 months, toddlers can already try to lessen those conditions that make them feel sad or angry and increase those conditions that make them feel happy. It could be the way they arrange the toys, the way they flirt with and seek out a caregiver. Toddlers are already becoming active social problem-solvers using finely regulated emotional interactions, now in a larger problem-solving context.

Children progress further up to age 2 or 2½, and, as indicated earlier, can form images in their mind (symbols or ideas) and label the feelings that have come under fine regulation. They understand these regulated feelings more fully than unregulated ones. When a feeling is part of a regulated interaction with someone else, one understands its context and gains perspective on it. We see this in the pretend play of well-regulated children. They have many long chains of back-and-forth interactions with many details in their dramas as they create scenes where there are subtle interactions around anger, happiness or sadness. Children who are more extreme in their reactions in contrast tend to evidence more global pretend play patterns. The characters get excited and bang the floor, simply crash cars, or just go to sleep. Their pretend play often reflects the degree to which they can regulate and modulate their feelings. For children capable of regulated reciprocal interactions at the level of using ideas, they are able to label feelings and begin to ponder them.

At the next level (building connections between ideas), as discussed earlier, children can begin reasoning about their feelings, figuring out why they are happy or sad or joyful. This occurs between ages 3 and 4. As they become older, they can further reflect on these feelings and understand them in a larger context of their peer relationships. They can understand more subtlety in the gray area of feelings, in other words, how angry, happy, or sad they feel. As a child becomes older this capacity for reflective thinking with feelings becomes stronger and stronger.

These steps of labeling and reflecting on feelings depends on that important earlier step of experiencing these feelings and behaviors as part of a back-and-forth signaling system. Without that step, the feelings stay in a catastrophic global mode (the all-or-nothing mode where I am extremely angry or excited). The continuation

of a global, unmodulated quality interferes with the progression to reflective thinking because it's hard to symbolize unmodulated extreme feelings. There is too much pressure to put the feelings into action rather than into ideas and words. The feelings are so strong in the unmodulated form that they create a reality about them, a sense of urgency and immediacy that is stronger than the idea that could represent or symbolize them. In other words, when the feelings are extreme, the tendency is to discharge the feeling, put it into action or just shut down and avoid it entirely rather than label and think about it. The child who is in the middle of a rage may be able to say, "I'm angry," but he is still biting, yelling, screaming and hitting. Even if he can label a little bit, the labeling isn't serving the purpose of using the idea or reflecting on it. In contrast, the child who says, "I'm angry. I need my milk now, please" is using the idea to convey the feeling. He is not being dominated by the feeling but is trying to communicate something that will alter the feeling.

Perhaps most importantly, the capacity for a continuous flow of back-and-forth, affective signaling is essential for establishing a sense of reality, reality testing (the ability to distinguish fantasy from reality), the capacity for organized thought (rather than fragmented thinking), and an organized sense of "self." Children who do not engage in a continuous flow of affective gesturing live in a world of islands of back-and-forth episodic reality contacts with the world. Their sense of reality, as defined by the continuous reciprocal exchange of information with another (to balance and define one's inner life) is piecemeal. As a result, their thinking, sense of reality, reality testing, and sense of self is fragmented. Not surprisingly, many children with special needs who make outstanding language and cognitive gains have difficulty with these higher-level capacities involving a stable sense of "self" and "reality," because their programs don't sufficiently emphasize a continuous flow of affective gesturing as a foundation for higher level capacities. In contrast, the continuous flow of affective gesturing, when coupled with emerging symbolic interaction, creates the nexus for organized, reality-based thinking, a stable sense of self, and the capacity to learn still higher level capacities for judgement, self reflection, and insight.

It should also be pointed out that extreme anxiety tends to disrupt the child's capacity for long reciprocal chains of subtle and differentiated affect cueing. Individuals, when they're anxious, typically stiffen their facial muscles and become more global (i.e., less differentiated) in their affect expressiveness, even though their anxiety or fear may be quite observable in their facial features. The result of this anxiety-based interruption in affect cueing is a tendency toward fragmented (rather than integrated) thinking. Fragmented thinking, in turn, lends itself to distortions, exaggerations and polarizations, and further intensifies fear and anxiety. This pattern leads to a cycle of increasing dysfunction.

Children with sensory processing difficulties, including visual-spatial processing, auditory processing, or motor planning, or sensory modulation challenges are especially prone to extreme anxiety because it's more difficult for them to regulate, comprehend, and operate on their social and physical worlds. It is, therefore, particularly easy for children with special needs to become involved in these cycles of

anxiety and fragmented thinking. As indicated, the fragmented thinking then leads to more polarized perceptions and often catastrophic emotional states (which operate at an all-or-nothing level, rather than a finely regulated, modulated one) and the intensification of the cycle of dysfunction.

Recognizing this pattern has important implications for intervention. The most helpful intervention strategy is to calm the intense anxiety and fear through reestablishing affective or emotional contact with the child in a highly soothing manner. Then it is vital to begin the process of reciprocal, affective exchanges with an especially soothing manner and tone. One is simultaneously calming the child and bringing the child back into reciprocal affective interchanges, which will enable him to organize his thinking, become more reality based, and exercise more finely tuned judgment (rather than operate under the agencies of catastrophic affects in highly polarized, distorted thinking patterns). The long term goal is to facilitate the child's ability to better and better re-engage on his own so that he can become a better agent at initiating long chains of soothing, affective interchanges.

A child who is operating under fine-tuned regulated affective interactions will be in solid position to use logical reality-based and integrated thinking to gradually increase his intellectual and social capacities. On the other hand, a child operating under states of intense anxiety with polarized and catastrophic patterns will be compromised in his or her intellectual and social progress.

In addition to dealing with anxiety, the pattern of reciprocal affective interaction can be a helpful therapeutic tool for working with problems with unstable or labile mood, attention and activity problems, and impulsivity. The individual with labile moods has difficulty sustaining a mutually soothing, calm, reciprocal affective pattern. If the reciprocal partner (e.g., therapist, caregiver) can down-regulate (i.e., a soothing tone of voice while maintaining a continuous flow of affective interchanges), as the patient or child is revving up, over time a new capacity for more continuous, soothing reciprocal interactions may be learned (often for the first time). As the patient is helped to gradually experience emotions or thoughts associated with mood shifts, these reciprocal patterns are especially helpful. Not infrequently, the original parental response to what may have been a biologically based tendency was to reciprocate the child's revving up with counter agitation or withdrawal, neither of which would provide what the child needed.

For the inattentive, active child, the reciprocal pattern may need to emphasize longer and longer chains of reciprocal interaction (to maintain attention), coupled with modulation patterns where the therapist or caregiver changes the rhythm of interaction (from fast to slow, slow to fast) and changes the intensity of response (such as loud to soft sounds and vice versa). In a sense, one catches the other person into longer and longer sequences with greater and greater modulation.

For the impulsive individual, the goal would be a combination of the intervention described for the moody and inattentive, active individuals, with increased soothing, longer sequences, and more modulation. This pattern would be implanted as the individual was helped to gradually experience the emotion that precipitated the impulsive behavior.

Affective Reciprocity, Evolution, and Intelligence

The capacity for a continuous flow of increasingly differentiated affective expressions may be a universal process in the development of intelligent behavior in different members of the animal kingdom. This hypothesis would suggest that the greater the capacity of the animal (or group of animals), including humans, to evidence differentiated, affective expressions and use them in gestural interactions to communicate and problem solve, the greater the animal's intelligence. In addition, the greater the capacity for a continuous flow of differentiated affective interaction, the greater the animal's ability to form complex social networks. Furthermore, the greater the social networks, the greater the ability to deal with basic needs and, therefore, the greater the ability to employ mental resources for the development of higher levels of intelligent behavior.

The capacity for affective reciprocity may, therefore, have been an important step in evolution as well as in human development. In human development, it is a critical step that enables exploration of the world and the regulation of behavior, mood, and eventually, thought. In evolution, the capacity for affective reciprocal interactions may have played an important role in the development of complex social organizations and culture. Reciprocal affective interactions are necessary for social groups (i.e., a method for quick and efficient communication of intents without resorting to extreme behaviors). Aggression, dependency, sexuality, and the like could be negotiated through affective cues. For example, an aggressive gesture could lead the "other" to gesture submission without a violent confrontation, as is often seen among mammals. Many such interchanges equal complex negotiations, for example, the capacity to communicate and negotiate favors. Social organizations which, in turn, allow for more efficient self-and group protection, food, housing, and weaponry production. Freedom from meeting survival needs during all of the waking time, in turn, would permit time for other endeavors, including more complex social interactions, pattern recognition under non-catastrophic survival emotions, and exploration of the next step beyond complex patterns, i.e., symbol formation.

Affective Reciprocity and Symbol Formation: Perception Without Action

This section will suggest a hypothesis about how symbol formation arose from the capacity for affective reciprocity. The ability for affective reciprocity may be both a critical step in the evolution and the human development of thought and symbol formation. As with many human capacities, evolution may repeat itself in the adaptive development of each infant and child. As indicated earlier, affective reciprocity is associated with regulating emotions and behavior and, thereby, mastering catastrophic behavioral discharge, feelings, and interactions. The regulation of behavior through affective signaling enables the individual to have perceptions

without taking action. What is perception without action? *Perception without action is imagery.* When the capacity for imagery is combined with the intentions (and their related affects) that are involved in reciprocal affective interactions, symbolic meaning develops.

Furthermore, while catastrophic survival emotions would keep one pretty well tied to concrete behaviors, modulated reciprocal affective states, in contrast, would promote higher-level mental (less concrete) capacities. It would promote associative learning and allow time for associative mental processes because affects would be motivating feedback-oriented interactions and learning from the environment and others, rather than immediate survival-oriented action. Symbolic art characterizing real events may have been an early form of symbolic expression. In other words, the capacity for affective reciprocity would favor social organizations, pattern recognition, symbol formation, and other higher-level mental abilities–all of which, in turn, would have evolutionary advantage.

In addition, the long interactive patterns that result from reciprocal interchanges create the capacity for expectations (i.e., pattern recognition). It is only a small step, then, to being able to abstract these "expected" patterns into a symbolic form. Both the taming of the extreme catastrophic emotions and the formation of complex patterns of expectations are important contributors to symbol formation.

Therefore, in both each child's development and in the evolutionary patterns that have preceded us, it is likely that the capacity for affective reciprocity enables the regulation of behavior and mood (i.e., the mastery of catastrophic behavior discharge emotions), and promotes social signaling, more efficient social organizations (which frees individuals from survival necessities and promotes economic and cultural growth), and the capacity for imagery and symbolic functioning. Much of this occurs because *affective reciprocity frees perception from action.*

Variation in Affective Reciprocity and Symbol Formation

These high-level mental capacities are far from universal, even among human beings. Affective reciprocity and the resultant capacity for symbolic functioning, as well as derivative social, emotional, and intellectual capacities, vary in relationship to experience. These capacities are not completely relative, however,(as one might expect from the perspective of cultural relativism). In spite of variation, there are two sources of similarity among peoples. One relates to the human perceptual apparatus. There are certain commonalties among most people in terms of, for example, frequencies of sound that will register and patterns of color or light that can be perceived. Less obvious, there are also certain functional developmental capacities (in terms of their basic structure) that are also shared by most people. These include, in addition to the capacity for affective reciprocity discussed earlier, the capacities for shared attention, relating to others, engaging in purposeful or willful interactions, negotiating complex reciprocal affective problem-solving interactions, creating ideas, building bridges between ideas, and progressing to some degree of higher-level

abstract and reflective thinking. It is interesting to look at how different cultures provide their own form of opportunities for babies to engage in experiences leading to these basic functional developmental structures and to see if some cultures do not provide such opportunities. In fact, the field of cultural anthropology may wish to consider these structural capacities together with ones already being studied.

The common perceptual features (e.g., sound registration) are based largely on a relatively similar biology. The common functional developmental capacities for relating, communicating, and thinking are based on common child-rearing and family practices and include experiences such as nurturing human caregiving to promote relating and sensitive affective signal reading and opportunities for interaction to promote purposeful, willful interactions and affective reciprocity. To the degree most infants have access to nurturing interactive caregivers, these structural personality characteristics will be at least somewhat similar among people.

At the same time, however, there will be variations on these capacities based on both biology and experience Some babies, for example, have a narrower range of functional sound recognition and are quite sensitive or reactive to high frequency sounds. Many children will not have access to nurturing caregivers and, therefore, will not learn to engage with others and participate in a continuous flow of affective interactions and, therefore, will not master the capacity for affective reciprocity. Consequently, their capacities for symbolic functioning will also be quite constricted.

At present, however, only small numbers of children evidence these more extreme biological or psychological patterns. What will happen if most children do not have opportunities to learn how to engage with caregivers and master the capacity for affective reciprocity due to changing child rearing, such as poor quality day care? What will happen if, due to toxic substances such as lead or dioxins, most children evidence extreme difficulties in the way their central nervous systems function? In such circumstances, the common ground that supports shared human capacities will decrease. This decrease will not lead simply to more human diversity, however. It will erode a shared sense of what constitutes reality, rational thought, or moral behavior. The glue that holds many societies together would be in jeopardy.

In addition to these relatively stable features of human functioning (for the moment at least), there are other features of human functioning that clearly vary from person to person. Within each of the functional developmental capacities, such as relating, affective reciprocity, and using symbols, each individual, based on their unique experiences, will cast their own signature. One individual will interact more around assertiveness, another around dependency, another around sexuality. Unique cultural and family experiences will contribute to these personal signatures. While sharing the capacity for thoughts and feelings, each individual's specific thoughts and feeling will, therefore, be uniquely personal and related to their personal history.

Importantly, however, the capacity to organize uniquely personal experience at a gestural, affective reciprocal or symbolic level (i.e., form a symbolic sense of self)

depends on the basic functional developmental capacities described above. As indicated earlier, perhaps the most critical of these functional developmental capacities for human development and for evolution is the capacity for long chains of affective reciprocity. It should not be surprising, therefore, that working with affective reciprocity should be at the center of clinical work with children with autistic spectrum disorders.

From Affective Reciprocity to the Development of Ego Signal Functions

Another important dimension of reciprocal, affective interactions is that they lead to the capacity for an individual to use affect as a signal, which fosters anticipation and consideration of alternatives rather than direct discharge, shut-down, or withdrawal. The regulation made possible by back-and-forth affective exchanges, as indicated, leads to symbolization and the symbolization of affect makes possible the use of affect as a signal.

Consider the case of a latency-aged child who tended to be either agitated or depressed. The goals of his psychotherapy were to help him progress to higher levels in his functional emotional capacities (i.e., ego development). Specifically, one of the goals was to enable him to engage in longer chains of regulated, reciprocal affective exchanges. During longer and longer exchanges, the therapist would help Andy better regulate his affective and behavioral expressions through critical preverbal, as well as verbal responses. For example, when Andy would begin to evidence more agitation in his voice and body movements, the therapist would deliberately move towards a more soothing, comforting tone to attempt to down-regulate the intensity of affect. When Andy would become more apathetic and self-absorbed, the therapist would deliberately move towards a more energized rhythm of preverbal and verbal exchange (e.g., more animated facial expressions and faster tempo) to up-regulate. At the same time that the therapist was working at the preverbal level, he would also, periodically, explore how Andy felt during these shifts of affective rhythm and intensity. During these times, he was attempting to help Andy symbolize and reflect on the subtle feeling states Andy was experiencing when either agitated or apathetic.

Over a period of six months, Andy was able to make progress towards both of these goals. He gradually responded to the therapist's soothing, comforting tone of voice and interactive rhythm by becoming more regulated (less agitated) when talking, for example, about his father being unfair or kids at school picking on him. He was also able to begin verbalizing more abstracted feeling states, shifting from somatic descriptions and descriptions of actions he was going to carry out to true descriptions and reflections on inner feelings. For example, instead of talking about his exploding insides or how he was going to punch so-and-so, he began describing "Feeling like my insides were shouting...like I was so mad."

Interestingly, as Andy was able to symbolize affect, he began being able to use affect as a signal (i.e., to both unconsciously and consciously anticipate next steps).

For example, he began to become aware of feeling angry and then could consider alternate actions, when his brother came into his room uninvited. It's important to note that his capacity to use affect as a signal was based on his first learning to regulate reciprocal affective exchanges and then describe his affective states symbolically. Both steps appear to be important. Without the regulation, affective states tend to be intense and, therefore, are often experienced in an overwhelming or catastrophic manner, and there is a tendency toward discharge or somatization or interpersonal withdrawal. The regulation of the affective interchanges enables shifts towards symbolization (i.e., greater awareness and description of subtle affective states) and, in turn, the symbolization enables the affects to also serve as intrapsychic signals.

Implications for Attention and Processing Capacities

The importance of reciprocal emotional interactions also becomes central when we are trying to help children who are having challenges, such as fears, anxieties, or impulse control problems. These and other challenges often involve some degree of unregulated feelings. Therefore, in addition to other therapeutic strategies determined by the child's and family's unique developmental profile, creating opportunities for long empathetic nurturing interactions around the child's different feelings can often go a long way to helping a child learn to regulate feelings and behavior (e.g., parents get down on the floor, follow their child's lead and tune into the child at the level of gestures and, if the child is 2 or older, through pretend play as well).

Interestingly, back-and-forth, regulated, affective interactions also help the child develop many of their most important information processing abilities, such as their capacity for attention, planning and sequencing actions, understanding space (visual-spatial thinking), and using words and language meaningfully.

Consider language. Words have to have meanings and meanings are conveyed through the emotional context within which a word is used. A word that is used as part of a back-and-forth pattern of negotiation will be a word with many emotional subtleties to it. The child who learns the word "fair" or "unfair," for example, can learn this in an all-or-nothing way, this is simply "fair" or "unfair," or can have subtle gradations of what's a little fair, very fair, extremely fair, or not fair, somewhat not fair, etc. These subtle gradations will only be learned as part of interactive relationships that involve a lot negotiation.

More illusive, though, is how these reciprocal interactions help a child learn to pay attention and plan and sequence actions (e.g., executive functions). Many have wondered why we are seeing more children with attention and motor planning problems. One contribution might be fewer opportunities for long chains of reciprocal problem-solving interaction in child/caregiver relationships. Consider how this process may work. In order for a child to carry out a two-step and then a three-step and then a five-step plan, it is very helpful to have all the elements of that plan invested with lots of emotion.

The ability to carry out a number of steps in a row, that is, to plan and sequence actions, begins with simple reciprocal interactions. The emotional recognition that one's actions can have an impact on someone else is the foundation for sequencing (i.e., the ability to carry out many steps in a row where each one is related to the prior one). This is exactly what reciprocal interactions are. Smiles lead to smiles, frowns to frowns, sounds to sounds, movement to movement. The harder it is for the child to continue a long chain of interaction, the more important it is to practice long, regulated sequences of interactions.

In order to practice affectively, however, one needs to put more and more emotion into the interactions. The more vibrant and interesting and emotionally meaningful the interaction is to the child, the longer the sequence the child will mobilize. This doesn't mean loud or extreme emotions, it means subtlety and expression (soft or gentle, exciting or captivating, depending on the moment and the child). In essence, some degree of emotion or intent is what carries the child's ability to sequence. Therefore, the emotional interest that the adult must bring to the situation will have to be greater when the task is harder.

As a child graduates from simple reciprocal interactions to more problem-solving interactions, the ability to plan and sequence also improves because the child is now sequencing longer chains of reciprocal interactions. At the next level where ideas regulate behavior, a child can map out sequences with visual images and verbal ideas. And as logical thinking begins to dominate, the child can plan strategies for executing actions and consider a number of alternatives. The entire system of planning and executing problem-solving strategies, though, depends on the child being able to link many pieces of behavior together into a long reciprocal pattern.

The degree to which these patterns can be elaborated in many different domains of life increases the degree to which the child can plan and execute actions in these different domains. For example, some children are very good at social negotiations, but not very good at fixing a toy, figuring out how to find a hidden object, or self care in the bathroom.

The domains that are more difficult for the child require more involvement with long chains of reciprocal emotional interactions. In essence, one needs to build up the basic patterns in areas that are hard for the child. For example, a child who is very engaged, warm, and is very good at social sequencing, negotiation, and problem-solving has a hard time with visual-spatial sequencing (he has never been able to conceptualize how space is laid out). For this child, emotional interactions using space, such as hide-and-go-seek games, treasure hunts, other search games and like, would strengthen this basic capacity. This same principle applies to children who have trouble understanding the spatial dimensions of their own bodies, integrating their left and right sides, for example. Here, too, reciprocal interactions involving the human body, games such as "touch my nose and I'll touch your nose" would facilitate body-oriented visual-spatial problem-solving.

Many clinicians who work with exercises such as left hand to right shoulder or different kinds of games involving different types of crawling and walking often believe that all that is going on is exercising the body and processing capacities. The

gifted clinician working with the child, however, is often working in a highly reciprocal manner developing reciprocal sequences in the context of visual-spatial thinking, or other processing abilities. It is the chains of regulated reciprocal interaction in that particular domain that creates the foundation for improved cognitive abilities in that domain.

It would be useful to study caregiving patterns associated with different capacities for attention and sequencing. The hypothesis would be that less reciprocal caregivers are associated with greater attentional and sequencing problems in their children. Furthermore, the optimal attention and sequencing capacity would be associated with caregivers capable of long reciprocal chains in many functional areas (e.g., motor, language, visual-spatial, social) with a tendency to support the child's gradually increasing assertiveness. The caregiver would begin with a continuous response pattern, but gradually shift to a more intermittent pattern as the child became more self sufficient. For example, the caregiver would reciprocate each gesture initially, but as the child became able to sustain his or her initiative, reciprocate relatively intermittently but sufficiently to help sustain the pattern. If the child were talking, one would gradually shift to letting the child say more and more before commenting or asking a question.

Affective Reciprocity, Motor Planning, Rhythmicity, and the Development of Language

Long chains of reciprocal interaction support the toddler's capacity for engaging in planning and sequencing actions (i.e., long problem-solving sequences involving social interaction and mastery of his physical environment). These sequences of long problem-solving interactions, in turn, support many critical aspects of language development. As discussed earlier, preverbal gestural (i.e., problem-solving actions), social, and problem-solving interactions create the context for meaning of verbal symbols. Without this basic level of knowing through doing, words, when they became possible, would have no experiences to draw on to create meanings. In other words, the child knows what love is through his hugs, cuddles, and flirtatious glances. The word summarizes the concept or meaning he has been gradually forming. Similarly, words for "open," "up," or "door," all have their experiential contexts.

Reciprocal affective interactions also influence the basic grammar and semantic aspects of language. We have found, for example, that children not capable of reciprocal affective interactions (e.g., children with autistic spectrum disorders), tend to use words ungrammatically, repeating nouns or verbs perseveratively, for example. Interestingly, if we try to simply correct their grammar, it doesn't work very well. They make progress, however, when we first help them engage in reciprocal affective gesturing and use their affect and gesturing purposefully (e.g., we get stuck behind the door they are opening and closing and they eventually learn to push us

away). At that point, they begin to align their verbs and nouns in a grammatically correct manner–"Daddy, go!" or "Leave me alone." We observe the same patterns in children from deprived backgrounds, such as orphanages. Whether the insults are environmental or biological, it appears that a prerequisite for correct use of grammar is the purposeful use of affects in interactive relationships. This fact may have been missed by linguists who suggested grammar was largely innate and simply turned on or off by global features of the environment because it's easy to take reciprocal affect cueing and other preverbal aspects of communication for granted. They occur so regularly. It's only when we find circumstances where they don't occur that we can see their true impact.

Similar to grammar, the meaning of words, both the semantic and pragmatic aspects are also imbedded in the earlier reality of gestural interactions, which are used to explore and know the world. The literal meaning of a word or concept, for example, the concept of a door or a table or a mommy or a daddy is first known through gestural interactions with it. The capacity to form the word is then linked to what is already partially known. The known entity takes on additional meaning through context and further emotional experience with it. Therefore, both the literal and the relative meaning of words and concepts emerge from reciprocal affective interactions which provide the foundations and context for meanings.

The capacity for long chains of reciprocity and the basic capacity to plan and sequence actions may also support the ability to sequence words or ideas and eventually concepts in a speech, essay, or debate, or simply a long conversation. Sequencing ideas relates both to this basic ability to abstract meaning from earlier preverbal experiences and then sequence them meaningfully.

Also, as discussed earlier, the very capacity for forming symbols derives from the toddler's ability to negotiate through reciprocal interactions involving long problem-solving sequences. An image not tied to the need for direct discharge can become a thought (i.e., a symbol). In addition, long chains of reciprocal communication become pleasurable in their own right because they foster greater co-regulation of relationships and provide safe and secure ways to express and negotiate feelings and needs and therefore become an end in their own (rather than a means to some other gratification).

There are, however, other subtle contributions of affective reciprocity and motor planning and sequencing to language development. Affective reciprocity and planning and sequencing capacities occur in rhythmic patterns. Vocal and motor interactions between caregiver and toddler exist in various rhythms, rapid exchanges of vocalizations, slow exchanges, simple rhythms of monotones, novel rhythms of animated dialogues, and so forth. We all get bored and tune out with a slow, even, rhythmic monotone and perk up and listen better with a more rapid, novel, changing rhythm, particularly when these are in tune with the meanings of the words being expressed (e.g., speeding up or slowing down to emphasize an emotional point). Some people, however, are better at listening, even if it's a slow monotone. Similarly, as infants and toddlers are identifying and using vocal patterns, there is an intimate relationship between what can be perceived (i.e., processed

auditorially) and what can be articulated (a child hears sound patterns and tries to imitate them). A toddler or child who has a hard time planning and sequencing actions and therefore with reciprocal affect cueing, may have a relatively more difficult time engaging in and recognizing the rhythmic patterns underlying aspects of auditory perception and expressive language.

In many respects, the capacity of rhythmic interactive patterns, which is a component of motor planning and affective reciprocity, is a vital dimension of language. There has been recent research on the temporal aspects of auditory processing and language, including intervention strategies developed based on temporal dimensions, for example, slowing down the presentation of sound sequences (Tallal, et al., 1996). Another vital component of the temporal system, however, is the rhythmicity of sound sequences. There is likely very different thresholds of sound sequencing for perceiving patterns. Too slow a presentation, for example, may make pattern recognition more difficult. Research in progress on the Interactive Metronome (Shaffer, Jacokes, Cassily, & Greenspan, 2001) is revealing an optimal rhythmic range below which sound patterns are very difficult to perceive. This research is also identifying differences in the degree to which individuals with different processing challenges and diagnoses can perceive these patterns.

Reciprocal gesturing and motor planning and sequencing, particularly its rhythmic dimensions, may also be especially important for oral-motor sequencing capacities and overcoming oral-motor dysphoria, as well as stuttering and lack of expressive intonation. Improving reciprocal affective gesturing and the related capacities for motor planning and sequencing may, therefore, contribute in a number of ways to the processes that support language development. These may range from the basics of auditory perception and imitative production of sounds and words to symbol formation and meaning.

In summary, a baby uses simple exploration of relationships outside herself to enter into reciprocal interactions. She then uses reciprocal interactions to explore her world. Longer and longer and increasingly more complex chains of reciprocal interactions, using the different senses and the motor system, then give birth to a variety of the seemingly discrete cognitive, language, social, and visual-spatial and motor planning skills. Gradually, the child progresses through the six stages described earlier to higher levels of creative and reflective thinking.

Implications for Children with Special Needs

An important consequence of understanding how important reciprocal affective interactions are for regulating emotions, mood, and behavior relates to therapeutic and educational interventions for children with special needs.

Many children with developmental or emotional problems have difficulties at the fundamental level of back-and-forth signaling globally or in a certain area, as indicated above. Their difficulty may be an inability to engage in or sustain long chains

of affective reciprocal interactions or to mobilize them in specific processing or emotional areas (e.g., around motor planning, visual-spatial thinking, or feelings of anger or loss).

An appropriate therapeutic approach must work at the level of facilitating reciprocal affective interactions generally and/or specific areas such as language, motor planning, visual-spatial thinking, or expressing anger. The Developmental, Individual-Difference, Relationship-Based model (DIR, i.e., floor time) conceptualizes a comprehensive approach with reciprocal exchanges of affect cues at its foundation (Greenspan, 1992; Greenspan & Wieder, 1998). Many therapies, however, try to help children *without* establishing reciprocal chains of affective interaction generally or in the area where they are missing. For example, many very structured approaches to therapy, such as behavioral approaches for children with autistic spectrum disorders, fail to realize that one of the primary goals for many of the children is to establish the ability for interacting in a continuous reciprocal flow, that is, for entering into these long chains of reciprocal back and forth communicating. In fact, the lack of reciprocal interaction is one of the key deficits in autistic disorders. The goals of all interventions for autistic spectrum problems needs to involve reciprocal affective interaction, abstract and creative thinking, true empathy, flexible peer relationships, and emotional flexibility and spontaneity.

Behavioral treatment tends to be a stop-start approach, rewarding the child for matching a shape, for example, or for repeating a certain sound. Gifted therapists, in spite of the curriculum sometimes enter into continuous flow with the child, which is usually associated with better progress. Ivar Lovaas, at a meeting where he and I presented and compared the ABA Discrete Trial approach and the Floor Time approach (and had a chance to discuss the relative strengths of both approaches), showed a videotape of himself working with a child in his early years. In the tape, he was entering into a continuous flow of back-and-forth reciprocal communication, which is very different from many of those who carry out his procedures. He was charming and warm and exchanged lots of affect while purporting to offer rewards and punishments. I gently pointed this out to him and he intuitively acknowledged the importance of getting into a relationship with a child where the child feels warm, appreciated, and nurtured. This didn't lead to a fundamental altering of his theoretical position about what he felt was important, however.

The stop-start approach advocated by formal behavioral theory and procedures often interferes with caregivers or therapists establishing a continuous reciprocal flow and affective rhythm. We've seen many children in consultation who have been involved in intensive, 30 + hours/week behavioral (discrete trial) programs. We've also observed children as part of a research program who were involved in intensive 30 + hours of behavioral-discrete trial programs. The children we observed in the research program were described by their therapists and parents as having had very good outcomes. The patterns we observed are informative and suggest some of the strengths but also some of the weaknesses of behavioral approaches which did not focus sufficiently on a continuous flow of spontaneous back and forth affective

gesturing and (and use of language). While there were exceptions the general trend we observed are as follow: the children in these programs generally have learned to use some words and even read and do math, but often cannot engage in a pattern of continuous relating and back-and-forth gesturing; they have difficulty with spontaneous conversation; their behavior is often unregulated and unreciprocal in the sense that they can only conform to specific rules under specific circumstances; new situations are difficult; creative and abstract thinking, including the capacity for making inferences is severely restricted.

In fact, as indicated earlier, a deficit in reciprocal interactions and creative and abstract thinking is a defining characteristic of autistic spectrum disorders (Minshew & Goldstein, 1998; Dawson & Galpert, 1990; Tanguay, et al., 1998). After years of exlusively very structured behavioral intervention (stop/start), rather than a continuous flow of spontaneous reciprocal interactions, in our observation, many children still present as self-absorbed, idiosyncratic and repetitive, even though with the proper cues they can do very concrete and memory-based academic tasks.

When we then work with these children on their ability to interact with affective gestures, starting with simple fun games, and work up to back and forth negotiations (to open the door or to get the juice), we find that many children can move towards a continuous flow of affective interaction. As we engage children in this way, their repetitive, idiosyncratic and unreciprocal behavior begins to change. They begin using their behavior and existing language and thinking skills in a more purposeful creative and abstract manner. For children who begin this work at age 8 or 9, there is lots of catch-up, however. It can take a number of years to help them develop the basic skills for reciprocal affective gesturing that were skipped over. Many children appear to develop these skills more quickly and fully when intervention is begun at younger ages (Greenspan, 1992; Greenspan & Wieder, 1998). Many children benefit from a balanced program where there is a focus on both spontaneous reciprocal affective interchanges and semi structured problem solving activities. In our experience the key is that when working on specific goals in a semi structured way, the semi structured activities be set up as a challenge which illicits enthusiastic affect and a continuous flow of back and forth interaction while meeting the challenge. For example, teaching a child to “open” in the context of his trying to open the door to get his favorite toy which has been deliberately placed behind the door.

Implication for Child Care

The notion that emotional relationships are essential for regulating thoughts, behavior, moods, and feelings is one that needs greater emphasis as we think about child care settings and children’s activities. First, consider that the chains of long back-and-forth affective interactions that are necessary for regulating our behavior, moods and feelings can only occur with a loving caregiver who has lots of time to devote to her child.

A busy day care provider with four babies or six or eight toddlers usually won't have the time for these long sequences of back-and-forth emotional interaction. Similarly, a very depressed mom or dad or an overwhelmed caregiver with five children may not have the needed time, energy, or know-how. Full-time working parents, exhausted at the end of the day, may not be able to engage in these long patterns of back-and-forth interaction. In addition, parents who are being told that structured exercises with picture cards or computer games can improve their children's intelligence (rather than person-to-person interaction) may mistakenly take time away from important spontaneous, reciprocal interactions in order to do "exercises." They often do not realize that what they are giving up is more important.

Implications for Children with Emotional and Behavioral Problems

The importance of a continuous flow of affective communication is also especially relevant for many traditional types of psychotherapies that work with a range of children, adolescents or adults with circumscribed challenges. The following comments are, therefore, important for children or adults with special needs who have progressed to being quite verbal and related but who have circumscribed emotional challenges and for children and adults who do not have a history of special needs, but evidence selective emotional difficulties.

Traditional psychotherapies tend to focus on listening, reflecting back and summarizing what is being told to the therapist. For the child, this may involve reflecting on patterns revealed in his play; for an adult, it may involve carefully listening and summarizing back empathetically the feelings that are being shared with attempts at insight and pattern recognition. Many therapies involve a fair amount of empathy, warmth and support and sometimes selective guidance and advice.

What's missing, however, as a point of emphasis in many child and adult insight-oriented therapies is the importance of establishing a back-and-forth affective reciprocal flow. In other words, there will often be long times where the therapist is relatively passive, taking in, perhaps empathizing, summarizing, and clarifying periodically, but not working at establishing a dynamic back-and-forth affective interaction. Some child therapists do this as part of the give-and-take in play and are very helpful to their children, but others do not. Some adult therapists who are generally interactive people will do some of this intuitively, particularly for patients who are a little more self-absorbed, withdrawn or depressed. By and large, however, reciprocal affective interaction has not been an explicit focus of therapy, and there is a deliberate stop-start quality to many therapeutic interactions (i.e., long passive pauses rather than dynamic, gestural, back-and-forth, affective cueing and interactions).

Some patients come to treatment with well-developed reciprocal affective regulatory capacities and require help with circumscribed feelings, thoughts, or behaviors. The traditional stop-start approach may not be a problem for such patients and the patterns, clarifications, or insights discussed may prove helpful. For the

patients whose affects, behaviors or moods are not part of well-established regulatory interactions, i.e., have not been part of this dynamic continuous flow of regulated behavior since infancy and early childhood, however, the focus on reciprocity is paramount for the success of the therapeutic endeavor. As a first step, simply entering into a reciprocal flow around particular emotional themes may be extraordinarily helpful to the patient. One could postulate that the regulation and differentiation occurs through reciprocal interactions around particular emotional areas, such as assertiveness or aggression or sadness or loss or humiliation or shame, etc. Establishing reciprocity in specific emotional areas is an early step in the therapeutic hierarchy. Just as this step is necessary for normal development, it is necessary for many patients who lack this ability in specific emotional areas or generally. The unregulated patient is at the mercy of global or extreme feeling states. These must be regulated before they can be fully understood symbolically.

Over time, regulated reciprocal interactions in emotionally and thematically important areas lead to problem-solving around that particular emotional theme and then to labeling with ideas and eventually to reasoning. This can lead to high levels of reflection and insight. The process starts, however, with the ability to enter into affective reciprocity around the emotional theme in question. The importance of reciprocal affective interactions may explain why gifted intuitive therapists, even without a lot of experience, may at times do better than experienced, but emotionally less intuitive, therapists. We all know aides or helpers who don't have an educational background who can often be quite therapeutic. Perhaps it is this ability to establish affective communications in a particular thematic area and engage in a reciprocal continuous flow in these areas that enables such people to be "therapeutic." Some individuals have a naturally bigger range of different emotional areas They can empathetically respond in a continuous affective flow in the areas of warmth, intimacy, aggression, assertiveness, loss, humiliation, shame, etc. Others are more limited. The individual's "range" may also be part of what makes some individuals gifted in terms of their therapeutic capacity regardless of their background and training. Interestingly, the explicit training of the therapist may become more important at the symbolic levels where we try to help the patient label the feelings, engage in symbolic elaboration and pattern recognition, and develop reflective capacities as well as insights. Many training programs help professionals develop these traditional skills which are also important for successful therapy. These skills can't be successfully implemented, however, unless the patient comes in already skillful at the earlier levels of affective reciprocity or is helped to work on these earlier levels.

Some therapists who are less inclined to work on insight and reflection and more on changing behavior will use cognitive behavioral approaches. Imagery is worked on in specifically designed ways. Here, too, however, the ability to work successfully may depend on the mastery of the earlier level of entering into long chains of affective reciprocity. With greater awareness of the importance of affective reciprocity, perhaps it will be possible to train therapists more fully. What's intuitive for some perhaps can be learned by others.

The importance of affective reciprocity is relevant to other therapists as well, especially those who use structured techniques (e.g., speech pathologists, occupational therapists, physical therapists, special educators, and early childhood educators). Working in areas such as auditory processing, motor skills, or visual-spatial thinking requires a highly interactive affective reciprocal manner. As one does this, that system (the motor, visual-spatial processing or auditory processing) undergoes regulation and differentiation. This enables the child to move up the ladder to symbolic elaboration and reflection. Structured methods in these different therapies may be more useful once the child has mastered a reasonable level of affective reciprocity.

Rather than think of this as two steps in a process, where the child goes from reciprocity to symbol formation, the process can be thought of as operating at multiple levels at the same time. The emphasis is on reciprocity when it is not present and hasn't been mastered. As one moves into the symbolic level, one continues working on reciprocity but adds on symbolic elaboration and the capacity for reflection. Structured techniques can also help further differentiate language, motor, sensory, or visual-spatial thinking skills. They are most helpful, however, when operating in the context of ongoing affective reciprocal interactions.

Conclusion

We have explored the role of affect in the core deficit in autism and in the development of intelligence and social skills. In a sense, we have come full circle. We have discussed how children with autistic spectrum disorders may uniquely, for biological reasons, miss a critical developmental capacity, the ability to connect affect or intent to motor planning and sequencing capacities and, therefore, have a difficult time engaging in the long reciprocal chains of affective interaction so necessary for creative and abstract thinking and high-level social skills. We have also discussed how these same affective interactions underlie intelligence and social development. To improve assessments and interventions for children with a variety of challenges including autistic spectrum disorders, it is imperative to appreciate the role of affective interchanges in disordered and healthy development. The Developmental, Individual-Difference, Relationship-Based model (DIR) enables us to appreciate the role of affect in development by systematizing its dimensions (i.e., its functional developmental level, individual difference, and interactive relationship patterns) (Greenspan, 1992, 1997b; Greenspan & Wieder, 1997, 1998, 1999).

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