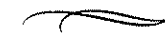


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THE FIRST IDEA

*How Symbols, Language, and
Intelligence Evolved From Our Primate
Ancestors to Modern Humans*



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mental organization. We will describe the steps or stages in this process that lead to new levels of symbolic and reflective thinking.²¹

Thus, emotions, which start off as a physiologic system receiving input from the senses, become, through interactive experience, a complex social tool and a vehicle for creating internal mental life. We will see how emotions eventually serve as the architect of intelligence.

In this section, we have described various critical early transformations of emotions:

1. Physical and physiologic reactions become part of the infant's experience of a nurturing, pleasurable, calming relationship with a caregiver (if such a relationship is available).
2. The relationship makes possible a new range of sensations based on human-to-human nurturing interactions. For example, these include a type of soothing, intimate, pleasurable sensation that is not available from impersonal environmental stimuli.
3. These types of sensations, or "emotional" experiences, now make it possible for the infant to *double-code experience* according to its physical and emotional properties; for example, mother's voice registers physically in a certain frequency range and "feels" pleasurable, secure, or frightening.
4. As caregivers respond to the infant's experience and expression of emotion, emotions become more differentiated and purposeful.
5. As simple back-and-forth patterns of emotional exchange become more continuous and complex, they are increasingly used for social signaling and interpersonal communication and regulation.
6. As interactions between caregivers and infants become more complex, the infant experiences a wider range of these unique sensations. A growing central nervous system, in part supported by these interactions and, in part, supportive of them, makes more differentiated interactions possible so that *the infant improves her capacity to recognize patterns*. The ability to recognize patterns enables the infant to "make sense" of these emotional interactions and begin to experience them as patterns and as part of a developing sense of self (as will be described more fully later in this chapter).
7. As these types of co-regulated emotional exchanges continue, they enable the separation of perception from action (explained in Chapter 1); this in turn leads to symbol formation.
8. As symbols are formed (described in Chapter 1), a child not only experiences these emotional patterns but labels them according to their "felt" characteristics.

9. In this way, subjective emotions and feelings differentiate out of early physical and physiologic sensations.
10. The continuation of increasing capacities for emotional signaling and symbol formation creates the basis for a progressive series of emotional transformations and leads to higher and higher levels of intelligence and reflective thinking, as outlined in the stages described below.
11. Through their progressive transformations, emotions, which can be experienced in an almost infinite number of subtle variations, can organize and give meaning to experience. They can, therefore, serve as the architect or orchestra leader for the mind's many functions. At each stage in the pathway to intelligence, emotions orchestrate cognitive, language, motor, sensory, and social experience.
12. The increasing capacities for emotional signaling also provide the means through which social groups form and societies function.

THE STAGES OF EMOTIONAL AND INTELLECTUAL GROWTH

In the pages that follow, we map the mysterious and revealing journey from an infant's earliest emotional interest in sights and sounds to an adult's reflective wisdom. We will observe that, beginning with the dual coding described above, each stage of emotional and intellectual growth involves the simultaneous mastery of what are ordinarily thought of as emotional and cognitive (or intellectual) abilities.

For example, as we discuss in more detail later, a baby first learns "causality" not through pulling a string to ring a bell or other similar behavior, as Piaget thought, but through the exchange of emotional signals (I smile and you smile back). Therefore, this early lesson is emotional and cognitive at the same time. At each stage, new cognitive skills are learned from emotional experiences. Even high-level symbolic and reflective thinking employs emotional awareness as part of its defining characteristics. For example, one of the levels of emotional development we will discuss later involves reflective thinking based upon an internal standard and sense of self. At this level, an individual can reflect and say, for example, "I'm angrier than I should be in this situation." Such an individual can also compare two authors and their treatment of an abstract concept, such as love or justice, in relationship to her own evolving experience of these concepts. She might observe that one author is far more insightful

than another in exploring the complexity of "justice" in a situation of competing motives.

To grasp concepts such as justice or love, however, or for that matter to understand the motives of a character in a novel, a person needs to have an internal sense of "self." Without a sense of self, there is no stable internal compass or frame of reference upon which to compare, contrast, or make judgments. It is not by chance that this sense of self becomes more organized and complex as the capacity for reflective thinking and making judgments about one's own behavior and thoughts and comparing them to the perspectives of others is emerging. The *sense of self* is the agent of these judgments. As it further develops during the course of life, it enables an individual to observe, comprehend, and reflect on an ever widening view of the world. In contrast, no matter how strong one's memory, language abilities, or calculating skills, if one has a very rigid sense of self and personality, he will "see" and comprehend only a narrow piece of the world and draw very limited conclusions. As we will see in the sections that follow, our emotions and sense of self influence our "awareness," what we are consciously able to grapple with and attempt to comprehend. It influences the depth of our understanding and ultimately our intelligence and wisdom.

Therefore, memory and selected cognitive skills, which can peak during the early adult years, may be sufficient for mathematical work, but it's difficult to be "fully intelligent" without experiencing deeply and profoundly the full range of many of life's essential, emotional experiences, such as love, disappointment, and competition. These unfold gradually in a variety of contexts throughout life. Therefore, true intelligence, such as wisdom, develops only over time. If we're fortunate, it does so throughout our lives. As we pointed out earlier, our genes are a key element in a biological system that prepares us to respond to and learn from experiences, but specific types of interactive emotional experiences are needed for the development of symbols, concepts, and abstract thinking. There are no known biological mechanisms that can *fully* account for the "meaningful" use of ideas. The description that follows of the stages of emotional and intellectual growth will demonstrate the seamless relationship between emotional and cognitive experience.

We emphasize that as we describe the stages of emotional interactions, we will also be describing and defining emotions in a particular way. We will not be looking simply at when a child smiles, frowns,

shows a look of surprise, or expresses feelings such as happiness or sadness. We will instead be looking at the child's overall emotional abilities, such as her ability to engage with others and exchange emotional signals so that she can understand others and communicate her own needs, her ability to elaborate emotions in play and with words and pictures, and her level of empathy.

These overall emotional abilities can incorporate different feelings such as anger, love, and sadness. For example, fully engaging with others involves love as well as sadness or disappointment. Full imaginative play involves happiness and joy as well as anger. These overall emotional abilities are "functional" in that they enable the child to interact with and comprehend her world. Therefore, in earlier writings we have called these abilities Functional Emotional Developmental Capabilities.

These abilities are functional in another sense as well. They orchestrate many of the child's other developmental capabilities. For example, as a child is learning to signal with emotions in the first year of life, she is using her emotions to determine whether to reach—that is, she uses her motor system and muscles—as well as what she vocalizes about: one sound for "I like that" and another for "I don't like that." As indicated, back-and-forth emotional signaling establishes a sense of causality—an early cognitive skill: "I can make my mommy smile with my smile." Emotions also lead the child to search for and find the hidden toy in her mommy's hand. She will search only for a desirable toy. Such searching and finding leads to perceptual motor and visual-spatial problem-solving skills. From early on, therefore, the infant's emotions orchestrate many parts of her "mental team." Her emotions enable the "members" of her mental team to work together, much as the members of a wonderful ballet company or an outstanding basketball team work together. Therefore, the emotional stages we will be describing are the "overall emotional abilities," or Functional Emotional Developmental Capabilities, which are different from specific emotions such as joy or anger. They are fundamental emotional organizations that guide every aspect of day-to-day functioning, unite the different processing abilities, and, as we will show in Chapter 11, orchestrate the different parts of the mind.

As we will see, these emotional abilities build on one another. For example, a baby must be engaged in a relationship with a caregiver for loving feelings to become part of an emotional exchange of signals. Using

emotional ideas—"I feel sad"—precedes building logical bridges between emotional ideas: "I feel sad because you didn't play with me."

Emotional abilities and stages may be only partially mastered. When this occurs, emotional development may still proceed, but in a constricted form. Like a house with a weak foundation, constricted emotional development may be more vulnerable to a "strong wind," or less broadly mastered. For example, relationships may be more superficial and less intimate, and empathy for other people's feelings limited only to selected feelings. The functional emotional developmental capacities we will be describing below, which begin early in life and continue through the course of life, are mastered at various times as a human being develops. Through a field study, we have been able to show that the early capacities are mastered for the first time (and then continue to be further developed) during specific, predicted time intervals. Furthermore, we have shown that the mastery of the early capacities is associated with healthy intellectual, social, and emotional functioning. In contrast, compromises in their mastery are associated with developmental and emotional difficulties.²²

In the next sections, as we describe the stages of emotional and intellectual growth, remember that these are but brief descriptions of more complex processes—the "tip of the iceberg." In addition, in actual development, mental growth is continuous and is "categorized" only for purposes of description and discussion.

Stage 1—Regulation and Interest in the World

Within the first few months of life, babies are learning to transform their emotions from their own inner sensations (e.g., focusing on a gas bubble in the tummy) to the outer world. They are learning to perceive the outer world—a mother's and father's face, voice, smells, and touch. But to perceive the outer world, they must want to look or listen. Although perhaps born with a tendency to perceive some basic patterns, they are enticed by the emotional rhythm of our voices, our big smiles and gleaming eyes—interesting sounds and sights. Rhythmic, almost synchronous patterns between the caregiver's and infant's movements or vocalizations enable the infant to begin relating to and appreciating the outside world. These patterns, which are part of the emotional relation-

ship between an infant and caregiver, begin prenatally. The mother-to-be relates to her baby's movement patterns and responses to sounds and other sensations, not to mention her fantasies about the new baby. The birth process itself and the time immediately after birth can be especially meaningful. Marshall Klaus and John Kennell have described how, when mother and baby are allowed to spend time together with direct physical contact immediately after birth (and an anesthesia has not been used), babies often crawl up their mothers' tummies to find the breast right after birth.²³ Such direct physical and emotional contact appears to have both physiologic and emotional benefit, resulting in less crying and improved mother/infant interaction in the early months of life.²⁴

During these early months of parent and baby interactions, babies gradually become more and more interested in sights, touch, and sounds, and begin discriminating between what they see, hear, smell, and touch. To elicit a baby's interest in the outer world, the sensations caregivers provide have to be emotionally pleasurable. If they are aversive, babies tune out or shut down and don't become invested in what is outside themselves. However, each baby has individual ways of responding to sound, sight, touch, smell, and movement. Some babies are very sensitive and require gentle soothing. Some are underreactive and require more energetic wooing. Some babies begin to figure out patterns of sights or sounds quickly; some slowly. Some readily turn toward sound or sights, but others take a while to notice. These responses happen more readily if adults tailor their approaches to each infant based on her individual preferences and abilities. Therefore, even at this first and most basic stage of learning, the baby depends on a caregiver's ability to adapt her gaze, voice, and movements in a pleasurable, emotionally satisfying manner to the baby's unique way of responding to and taking in the world.

Intelligence is forming during the very first stage as a baby is learning to use all her senses to perceive the world and discriminate patterns, such as the difference between mother's voice and father's voice.

The Dual Code. As we shall see, emotions orchestrate this process from the very beginning. A baby can begin the lifelong task of learning about the world only through the materials at hand, which, initially, are the simplest of sensations, such as touch and sound. Years of investigation into initial perceptions and cognition, on the one hand, and emotional development on the other, have left out a vital connection. In our clinical

work with many infants—both typically developing and facing challenges—we observed that each sensation, as it is registered by the child, also gives rise, as we said earlier, to an affect or emotion;²⁵ that is to say, the infant responds to it according to its emotional as well as physical effect on her. Thus, a blanket may feel smooth *and* pleasant or itchy *and* irritating; a toy may be brilliantly red *and* intriguing or boring, a voice loud *and* inviting or jarring. Mom's cheek might feel soft and wonderful or rough and uncomfortable. As a baby's experience grows, sensory impressions become increasingly tied to feelings. This *dual coding* of experience is the key to understanding how emotions organize intellectual abilities and indeed create the sense of self.

Human beings begin this coupling of phenomena and feelings at the very beginning of life. Even infants only days old react to sensations emotionally, preferring the sounds and smells of their mothers, for example, to all other voices and scents. They suck more vigorously when offered sweet liquids that taste good. Older babies will joyfully pursue certain favorite people with their eyes and avoid others. By four months, children can react to the sight and sound of people who have scared them.

However, as we said earlier, a given sensation does not necessarily produce the same emotion in every individual. Inborn differences in peoples' sensory makeup can make the sound of a given frequency and loudness—say, a high-pitched voice—strike one person as rousing and appealing, but another as shrill, like a siren. Though we generally assume that we all experience sensations—such as sound and touch—in more or less the same way, significant variations are now known to exist in the ways individuals process even very simple sensory information. We have explored the emotional consequences of those sensory differences first described by Jean Ayres, a pioneer in occupational therapy.²⁶ A given sensation can produce quite different emotional effects in different individuals—pleasure, for example, in one person, but anxiety in another. Each of us, therefore, quite unwittingly creates our own personal, and sometimes idiosyncratic, “catalogue” of sensory and emotional experience.

To add further complexity and individuality to the young child's learning, each of her sensory experiences occurs within the context of a relationship that gives it additional emotional meaning. Nearly all her emotional experiences involve the persons on whom she depends totally for her very survival, and who care for her in a manner that can range from expansive nurturing to near-total neglect. Emotions help a child

comprehend even what appear to be physical and mathematical relationships. Simple notions such as hot or cold, for example, may appear to represent purely physical sensations, but a child learns them through experiencing baths and bottles. More complex perceptions—big or little, more or less, here and there—have a similar basis in feelings. “A lot” is more than a child expected. “Too little” is less than expected. “More” is another helping of something tasty, “no more” is a dose of nasty medicine. “Near” is snuggling next to mother. “Later” means impatient waiting.

Even abstract, intellectual concepts, those that underlie theoretical scientific speculations, also reach back to a child's felt experience. Mathematicians and physicists may manipulate abstruse symbols representing space, time, and quantity, but they first understood those entities as tiny children wanting a far-away toy, or waiting for juice, or counting cookies. The grown-up genius, like the adventurous child, forms ideas through playful explorations in the imagination, only later translated into the rigor of mathematics. Before a child can count, she must possess this kind of emotional grasp of *quantity* and *extent*. When we worked with children facing developmental problems who could nonetheless count, and even calculate, we found that numbers and computations lacked meaning for them unless we created an emotional experience of quantity by negotiating over pennies or candies.

Each sensory perception therefore forms part of a dual code that has physical properties (bright, big, loud, smooth, and the like) and emotional qualities (soothing, jarring, happy, tense). This double coding allows the child not only to “cross-reference” each experience and subsequent memory in mental “catalogues” of phenomena and feelings but also to reconstruct them when needed.

Anyone who pays attention to the subjective state of her body will almost always perceive within it an emotional tone, though it may often be subtle, elusive, or hard to describe. Our inner emotional tones, tense or relaxed, hopeful or glum, serene or anxious, constantly play out the countless variations that we use to label and organize and store and retrieve and, most important of all, make sense of our experience.

We use our entire bodies to create, express, and bring to life our emotions: the voluntary muscle systems of our faces, arms, and legs for smiles, frowns, slumps, and waves, as well as the involuntary muscles of the gut and internal organs—a thumping heart or a stomach full of “butterflies.” Emotions such as excitement and delight reside primarily in the

voluntary system; others, including fear, sexual pleasure, longing, and grief, reside mostly in the involuntary system. Some global emotions, for example, "fight or flight," belong to portions of the nervous system formed early in evolution. Those involved in emotional social reciprocity and that make symbol formation and thinking possible belong to more recently evolved parts of the nervous system and rely on many parts of the brain working together, including the highest levels of the cortex.

In the earliest days and weeks, as a baby becomes aware of the world of sensation, a sense of "self" also emerges, but it is not yet a separate entity. The self is part of a global sense of the world of sensation and feelings.

Consciousness is also developing. It is likely that a baby's earliest sense of consciousness is a global state of sensory and affective "aliveness" (i.e., sensations and their registration in the broadest sense define consciousness). The baby's experience of consciousness is linked to the sights, sounds, touch, and, one hopes, pleasurable feelings she is experiencing.

Stage 2—Engaging and Relating

The second stage involves helping a baby use her emotional interest in the world to form a relationship and become engaged in it. With warm nurturing, the baby now becomes progressively more invested and interested in certain people. No longer will just any face or smell do. It has to be the mother's face or smell. From day one, the baby begins distinguishing primary caregivers from others; from two to five months, this ability reaches a crescendo through joyful smiles and coos and a deep sense of pleasurable intimacy.

In addition, higher levels of learning and intelligence depend on sustained relationships that build trust and intimacy. This progress involves more than simply fulfilling concrete needs. The concrete person who just wants "things" never becomes a fully reflective thinker in life's most important areas. For example, if we look at other people just as "things," we will not understand how they think and feel. Understanding others and feeling empathy for them comes from investing other human beings with one's own feelings. This ability, however, begins with first relationships. It depends on nurturing care that creates a sense of intimacy.

When a baby becomes interested in her primary caregiver as a special person who brings her joy and pleasure, as well as a little annoyance and

unhappiness, it is not only emotional interactions that begin flowering. A new level of intelligence is also reached. She is now learning to discriminate the joys and pleasures of the human world from her interests of the inanimate world. Her joy and pleasure in her caregivers enables her to decipher patterns in their voices. She begins to discriminate their emotional interests, such as joy, indifference, and annoyance. She begins to figure out facial expressions as well. Thus begins the long journey of learning to recognize patterns and organize perceptions into meaningful categories.

In forming a deeper, more intimate relationship, the baby is also learning her first lessons in becoming a social being, the cornerstone of being part of a family, group, or community, as well as, eventually, a culture and a society. Also, the baby's sense of self and consciousness is moving forward. Now that she is discriminating the human and inanimate worlds, the infant goes from feeling a part of a global world of sensations to a sense of "shared humanity." There is no separate, defined sense of "self" yet, but from shared intimacy with caregivers, a growing sense of special "human" feelings is emerging.

Stage 3—Intentionality

The third stage goes beyond intimacy and engagement. As we saw in Chapter 1, emotions now become transformed into signals for communication. For this to happen, however, caregivers need to read and respond to the baby's signals and challenge the baby to read and respond to theirs. Through these interactions, the baby begins to engage in back-and-forth emotional signaling. We also describe this back-and-forth signaling, which develops throughout infancy, but especially rapidly between four and ten months, as opening and closing circles of communication. The six-month-old smiles eagerly at her mother, gets a smile back, then smiles again. By smiling again, the baby is closing a circle of communication. Different motor gestures—facial expressions, vocalizations—become part of this signaling. By eight months, many of these exchanges occur in a row. As we saw, these emotional interactions help an infant to begin separating perceptions from their fixed actions.

Therefore, intelligence during this stage reaches an important new level. The beginnings of "causal" (logical) interactions, as the baby purposefully smiles to get a smile back, vocalizes happiness to get a happy

sound back, and reaches for father's nose to get a funny "toot-toot" sound back, means that from now on, causality and logic can play a role in all new learning. For example, these new lessons in logic are gradually applied to the spatial world as well as to plan actions (motor planning). When the rattle falls to the ground, the baby follows it with his eyes as though he were looking for it. He looks at and touches his father's hand because it just hid his rattle. The beginning sense of causality marks a beginning sense of "reality" because an appreciation of reality is based on understanding the actions of others as purposeful rather than random.

A sense of self also now becomes more defined. There is a "me" doing something to a "not me" or a "you." (The baby smiles [the "me"] to get a smile back from the caregiver [the "not me"].) But the "me" and the "not me" are not yet defined in the baby's mind as full persons. They are defined only in terms of the smiles or sounds being exchanged. In other words, "parts" of "me" (the self) that become involved in causal intentional interactions are forming. Each part of "me," or a self, is experienced as a separate entity. In the next stage, these parts of the self will come together. Consciousness is also growing. The baby experiences her own willfulness and sense of purpose more and more. Her consciousness of herself and of the world is gradually separating the physical world from the emotional world, the "me" from the "not me," and a sense of will, purpose, or agency from a sea of sensations, feelings, and responses.

Stage 4—Problem Solving, Mood Regulation, and a Sense of Self

In the explosive development that takes place between nine and eighteen months, a baby makes momentous strides. As we described in Chapter 1, she learns to engage in a continuous flow of emotional signaling and can use this ability to solve problems. For example, she may take her mother by the hand, gesture with her eyes and hands so that her mother will open the door to the yard, and then point to the swing; or she takes her dad to the car and shows him that she wants a ride. During this stage, true social problem solving emerges. As indicated earlier, however, caregivers need to read and respond to their toddlers' emotional signals and engage in long chains of shared social problem solving for this to occur. She also learns to regulate her moods and behavior and perceive and or-

ganize patterns to form a more complete sense of self. All this progress, which is built on increasingly elaborate emotional interactions, leads to higher levels of intelligence and social interaction.

Problem Solving. During this fourth stage, through a wide range of emotional interactions that are part of daily life, a child learns how to predict patterns of adult behavior and act accordingly. She learns, for example, that when her father comes home and looks grumpy, it's best to stay out of his way. Hide behind the couch or he will snap at you. The child learns that before her mother has had her morning coffee, she'd better walk and talk softly. These savvy adaptations are based on, and facilitate, an ability to recognize patterns. Pattern recognition, which ideally is learned first through social interactions, can then be applied to solve problems in the physical world as well.

The child who doesn't interact, however, won't experience or fully learn to recognize a broad range of patterns. The child who is taking a parent by the hand to search for a toy is coming to understand the elements of a pattern. These include her own emotional needs (what she wants), the action patterns involved in finding a toy, the visual-spatial patterns involved in going from ground level to upper-shelf level where the toy resides, the vocal pattern involved in attracting her father's attention (whimpers at not having what she wants, then gleeful exclamations of triumph), and the social patterns involved in working together with parents toward a common goal. In other words, pattern recognition involves seeing how the pieces fit together rather than just being involved in piecemeal behavior. Elaborate negotiations or play with others make it possible to experience the world in larger integrated patterns.

Recognizing patterns helps a toddler predict the behavior of others and adjust her own. She learns when to expect loving responses and when to expect anger, control, bossiness, or limit-setting. The child's moods respond to seeing the gleam in a parent's eye or the nodding approval for something well done. She's learning what respect feels like—as well as what humiliation feels like when she's done something she shouldn't. All these patterns are learned in the second year of life and before language comes in to a significant degree.

Regulating Mood and Behavior. In the daily loving exchanges and struggles with caregivers, the toddler learns to tame such catastrophic

emotions as fear and rage (as described in Chapter 1) with the more regulated and interactive use of emotions. Therefore, she learns to modulate and finely regulate her behavior and moods and cope with intense feeling states. Anger is explosive in a very young infant, and sadness seems to last forever and ever. Certain necessary experiences turn these extreme emotional reactions into feelings and behavior that are finely regulated and responsive to the situation at hand.

Once a child is capable of exchanging rapid signals with her caregiver, she is able to negotiate, in a sense, how she feels. If she is annoyed, she can make a look of annoyance or a sound or a hand gesture. A mother may come back with a gesture indicating "I understand" or "OK, I'll get the food more quickly," or "Can't you wait just one more minute?" Whatever her response, the child is receiving immediate feedback that can modulate her own 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 that she is getting that milk bottle ready and it's coming soon. If she can use a soothing voice and gradually calm the baby or toddler, the child will learn not to become so frantic. Adults often do this intuitively when someone they are close to is upset or angry. Some of us get nervous, however, and "up the stakes" by taking the other person's anger personally. If we can slow and soothe and calm via our emotional gestures (as well as our words—the gestures, however, are far more powerful), we can learn to better and better regulate our moods and behavior.

With a fine-tuned reaction rather than one that is global or extreme, the child doesn't have to throw a tantrum to register her annoyance; she can do it with just a glance and an annoyed look. This ability comes gradually. Even if a toddler does escalate to a real tantrum, she will not go from 0 to 60 in one second. Different feelings, from joy and happiness to sadness to anger to assertiveness, can become part of fine-tuned exchanges with patient, caring adults.

A child may not gain this needed experience of nurturing exchanges for a variety of reasons. Perhaps she has a motor problem and can't gesture or signal well, or maybe she has an unresponsive parent who is not signaling back. Perhaps she has a parent who is too intrusive and anxious or too self-absorbed or depressed to respond appropriately. For any one of these reasons, we may see a compromise in this fine-tuned interactive system. For such a child, there are insufficient regulated responses

for her emotional expressions. Her expression of feeling is, therefore, not part of a fine-tuned regulated signaling system: It may be simply an isolated expression of feeling.

Without the modulating influence of an emotional interaction, either the child's feeling may grow more intense or she may give up and become self-absorbed or passive. In either situation, the child may be left using the global feelings of anger or rage, fear or avoidance, which are characteristic of very young infants in the early months of life. One of us (S.I.G.) often sees such children in his practice. Not infrequently, when such children continually hit or bite, parents seek help, worried about "aggression," and often ask for "medication." When parents are coached on how to read the child's signals, respond consistently and calmly, and engage in long chains of regulated social problem solving, however, within a few months many of these children can become well-regulated, cooperative, interactive toddlers.

If, on the other hand, caregivers continue to respond inappropriately or not at all, the child can become even more vulnerable. With caregivers who overreact to powerful emotions, a child often tends to become more anxious and fearful. When caregivers tune out, freeze, or withdraw in response to fierce anger or other strong emotions from their infants and toddlers, the child may feel a sense of "loss"; this, in turn, may lead to an increased tendency to depression. When anger or impulsive behavior is dealt with by withdrawal or single intense punitive, rather than regulating constructive, limit-setting responses and opportunities for social problem solving, we tend to see more aggression and impulsivity.

Forming the Earliest (Presymbolic) Sense of "Self." A sense of self begins forming when a baby organizes her emotions and behavior into patterns. As a baby goes from islands of intentional behavior, such as a few vocalizations or one or two hand wavings or a few smiles, to a whole pattern of dozens of exchanges, which she uses to solve problems, she is learning that she and others can operate in larger chunks or patterns. This enables her to be even more intentional and to negotiate, rather than take piecemeal, episodic action.

This process happens step-by-step. When an adult responds reciprocally, the baby makes a discovery: "I can make something happen." This teaches a baby to take initiative (do something and something happens

in return; smiling gets a smile from mom or dad). As we indicated, from this process the infant is beginning to gain 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 by reaching out "my" hand). As a toddler's repertoire of emotional signaling grows richer and she begins to discern patterns in her own and others' behavior, she adds these observations to the map delineating herself as a person. Her mother usually responds when she makes friendly requests, but not when she's cranky. Her father loves to roughhouse, but not to sing lullabies. Grandmother is a good deal less strict than either parent. Which actions get affection and approval? Which yield only rejection or anger? Is she worthy of care, attention, and respect? Are those around her also worthy?

With the growing capacity to perceive and organize patterns, these types of experiences continue to define a developing sense of self even before words or ideas are used to a significant degree. In a similar way, the child is discovering how the physical world works—turning this little plastic thing causes a funny animal to pop up, or pushing this big, smooth, see-through object makes a loud noise and maybe even produces a splatter of little pieces and yelling from adults. Seeing the world in patterns increases understanding of how it works and leads to expectations and mastery, a scientific attitude.

The child uses this ability to discriminate, to distinguish among many patterns of emotions; she knows the difference between those meaning safety and comfort and those meaning danger. She can tell approval from disapproval, acceptance from rejection. Life's most essential emotional themes are identified and patterns of dealing with them formed. The child also begins to use this new ability in increasingly complicated situations. Is her mother's tense face a signal that she is angry with her daughter? The child starts to use this awareness to respond to people according to their emotional tones, for example, and to pull away from a situation that seems undermining.

The intuitive ability to decipher human exchanges and pick up emotional cues before any words have been exchanged becomes a "super-sense" that often operates faster than our conscious awareness. In fact, it is the foundation of our social life.

Therefore, long before an infant can speak, personality and expectations are already being molded by the countless interactions between

caregiver and child. However, no child's family or daily life affords equal interactions in all areas of experience. We may have many different responses to love and pleasure and only two to anger, or vice versa. Some families avoid certain emotions entirely. No child's environment is perfect, and parents who try too hard to provide one often quash the emotional spontaneity that is so critical to the entire process of development.

It is also important to remember that the developments of this formative period, though influential, are not definitive. Many elements of personality form early in life, but daily interaction continuously redefines it.

The basic skills that enable a child to read caregivers' and family members' signals also enable her to learn about her culture. The responses of her caregivers provide an unspoken but expressive running commentary along a scale of approval/disapproval, anger/happiness, curiosity/fear. Is defiance permissible? Is aggression or passivity sanctioned? How do people greet each other? Picking up cues from this subtext, the child learns before she has gained significant amounts of verbal language and knows what is good and bad, what is done and not done, what is acceptable and unacceptable.

During this period, co-regulated emotional signaling also has a role in gender differences. Our work observing very early interaction suggests that these differences may not be based solely on hormones or different brain structures. Learning experiences vary early in life and lead to important questions. For example, we have observed that many caregivers tend to engage female infants and toddlers in longer preverbal, affective "conversations" than boys. Does this contribute to girls developing earlier language skills, and perhaps empathy, than boys? The longer we gesture and signal back and forth to babies, the more we enable them to signal and negotiate with a large range of our emotions. Of course, individual girls and boys vary considerably in their early experiences. Each one will have his or her own unique early interactions and eventual personalities. As a large group, however, boys tend to be more active as babies and, therefore, invite shorter bursts of affective signaling. In our culture, we often play differently with boys and girls, more roughhousing with boys and more back-and-forth dialogues with little girls.

Is it any surprise that a child with more extensive early experience in navigating her emotional terrain will grow up better able to express how

she feels? Or that a child who tends to experience shorter emotional interactions might develop some of the characteristics we think of as typically "male," such as an inability to acknowledge his feelings, the strong desire to separate his emotional world from his rational one, or even the disturbing "all-or-nothing" discharge mode for these feelings, such as rage or withdrawal? At the same time, the action orientation and roughhousing may provide an opportunity to feel secure with his body and learn to be assertive and able to overcome obstacles.

It's important to emphasize, however, that as we speculate about the role of early interactions in the behavior we commonly think of as "male" or "female," each child and his or her caregivers will negotiate their own unique patterns. Therefore, each boy and girl can be understood only in terms of his or her unique history. During Stage 4, the toddler progresses to significantly higher levels of intelligence. Because of her emerging ability for long exchanges of signaling, she is becoming a better and better problem solver. Also, because growing problem-solving abilities involve signaling between herself and others, she is involved in an increasingly creative endeavor encompassing the input of two or more parties. For example, she may want to solve a problem one way and her father may gesture with a point, a puzzled look, or a big smile, suggesting either confirmation or an alternative. Through these types of interactions involving longer and longer chains of communication, new approaches are constantly being learned.

The toddler is breaking new ground in all her different intellectual domains. More complex vocalizations are emerging. A private language may be forming as a prelude to learning the family's language. With her caregivers as interactive partners/explorers, a more elaborate sense of physical space and an ability to engage in visual-spatial problem solving (such as finding hidden objects or figuring out a new way to get to a toy on the shelf or mother's favorite jewelry) is rapidly emerging. This occurs because physical space is now invested with emotional meaning through the pursuit of emotional goals.

Similarly, the ability to plan and sequence actions—conducting a five-step maneuver with a new truck (loading and unloading it, moving it to one side of the room and then the other)—is also rapidly learned because of interactive play where emotional goals are used to guide actions. As discussed earlier, the toddler is also learning to regulate her mood and behaviors better because of interactive emotional signaling

and, in this way, is also learning to modulate sensations. She is no longer as likely to become sensory overloaded or underaroused because she is now able to participate actively in the sensations modulating her. For example, she can seek out just a bit more sound or touch. She can slow down an interaction through her expressions, hand gestures, or body posture if it's becoming overloading.

As the toddler becomes an interactive problem solver in all these domains, she is literally becoming a multilevel, scientific thinker, figuring out and implementing new solutions all the time. This progress, in turn, makes her a better and better "pattern recognizer" and organizer, an ability that will underlie all her future academic skills.

Many infant observers and researchers focus on the first year of life and then jump to a focus on language development in the latter part of the second and third years of life. In fact, it's in the second year of life that emotional signaling becomes more and more complex and sets the foundations for language and higher levels of intelligence through the accomplishments just described. As we described in Chapter 1, it is during this time that a toddler is learning to use affect signaling to separate perception from action. This leads to freestanding images that the toddler can invest with emotional experiences. Such emotionally meaningful, freestanding images become meaningful ideas or internal symbols.

New social skills are also developing at this stage. Social signaling enables the toddler to handle multiple relationships at the same time, signaling a mischievous grin to her father and an annoyed look at her mother. Reading these emotional signals is also part of this process and it helps the toddler inhibit aggression, cooperate, and copy altruistic behaviors.

The ability to imitate also advances significantly. Now the toddler can copy large patterns, such as putting on her father's hat, lifting his briefcase, and imitating him as he walks about the house with a confident stride. As can be readily imagined, these abilities for social negotiation, multiple relationships, and rapid learning of whole patterns through imitation are the foundations for participating in groups. We have observed toddlers forming friendships by copying each other, following each other, enjoying some rough-and-tumble play together, and eventually, by eighteen months of age or so, hamming it up together and laughing at and with each other. Shared humor communicated via facial expressions and movements can become quite organized.²⁷ Initially, there is the family group and then a community, a society, and a

culture. Everything from simple tool use to attitudes towards aggression or closeness and intimacy are learned through complex interactive signaling and imitative learning.

Also, as we mentioned, long chains of signaling enable the presymbolic sense of self to become more integrated. Consciousness is, therefore, not simply made up of a "part me" (a smile getting a smile or a sound getting a sound). It's now made up of a more integrated sense of "me" as a whole person interacting with a more integrated sense of another (mother or father) as whole people. In other words, the happy "me" and the angry "me" are now part of one person, as are the "nice mommy" and the "frustrating or mean mommy." This greater integration of the parts of "me" and others occurs very gradually during the second year of life. During this time, islands of "me" gradually come together through longer and longer interactions with caregivers that embrace such polarities of feelings as anger and love. Consciousness also expands to include larger and larger physical spaces, as well as language and motor domains.

This stage of development figures importantly in the observations we have made regarding the developmental pathways leading to autism. As we will discuss in Chapter 11, children with autism (even those who develop verbal abilities, score above average on IQ tests, and do well on school-based academic work) have difficulties with making inferences; using higher-level, abstract, reflective thinking; empathizing with others; and dealing with their own and other people's emotions. In studying such children over time and exploring their histories and videotapes of their interactions during their formative years, we have found that the vast majority, even those who seemed to be doing well and "regressed" only at age two or later, did not fully master these emotional interactions of the second year of life and the skills that are based on them. Although some of the children could engage with caregivers and signal a little with emotions, they did not reach the point where they could take a caregiver to find a toy or engage in long exchanges or wordless dialogues of affective interaction to regulate their behavior and mood. They were, therefore, unable to develop the full range of higher-level abilities. For example, using symbols meaningfully and negotiating emotional and social challenges require investing symbols with regulated emotions ("Mom" is understood as the total of one's emotional experiences with one's mother). This development can occur only through many emotional interchanges with mother. Similarly, empathy requires a full sense of another as an emotional "other" and

can only be learned through the same process. In contrast, math or history facts can be learned largely by memorizing them.

We have formulated a theory, the Affect Diathesis Hypothesis,²⁸ which suggests that in autism co-regulated affect signaling is difficult because of a unique biological challenge. Children with autism, we believe, have a biologically based difficulty in connecting emotion to their emerging ability to plan and sequence their actions. Therefore, complex interactions that require many steps are not guided by needs or interests (emotions). As such, they stay simple or become repetitive. Fortunately, however, we have also found that this important developmental pathway involving emotional signaling, although a challenge for children with autism, is often not completely blocked. As we will show in Chapter 11, extra practice with meaningful emotional interactions can often help children with this type of challenge develop more fully. Perhaps there are "side" pathways that can be mastered when the main one is blocked. Through a comprehensive program that worked with this experience and ability, we found that we could help most children become engaged and interactive and a subgroup of children with autistic spectrum disorders become meaningfully verbal, empathetic, creative, and reflective, and engaged in solid peer and family relationships (see also Chapter 12).²⁹

Stage 4 is an important stage that develops over several levels and according to how complex and broad the interactive emotional signaling and problem-solving patterns become. These include:

- Action Level—Affective interactions organized into action or behavioral patterns to express a need, but not involving exchange of signals to any significant degree.
- Fragmented Level—Islands of intentional, emotional signaling and problem solving.
- Polarized Level—Organized patterns of emotional signaling expressing only one or another feeling state, for example, organized aggression and impulsivity; organized clinging; needy, dependent behavior; organized fearful patterns.
- Integrated Level—Long chains of interaction involving a variety of feelings: dependency, assertiveness, pleasure. These are integrated into problem-solving patterns such as flirting, seeking closeness, and then getting help to find a needed object. These interactive patterns lead to a presymbolic sense of self, the regulation of mood and behavior, the capacity

to separate perception from action, and investing freestanding perceptions or images with emotions to form symbols.

Stage 5—Creating Symbols and Using Words and Ideas

The emergence of formal symbols, of words and ideas, involves a momentous transformation. By this time, if there have been many opportunities for emotional exchanges, the child can now more easily separate action from perception and hold onto freestanding images and invest them with emotions. As children learn to regulate their tongues, other mouth muscles, and vocal chords, they can begin forming words to talk about these meaningful images or internal representations. If they have had lots of emotionally relevant experiences, they can create a broad range of meaningful symbols.

When children haven't learned to create emotionally meaningful images but are neurologically capable of speaking, the effect is very different. A child may see a picture of the table and say the word "table." She can label and perform rote memory tasks. But she won't be able to say "Mommy, play with me!" or "I don't like that!" Such a child won't have meaningful language later on. She won't fully comprehend written language, either. The child might learn to read and parrot back "red ball, green ball, blue ball," but won't be able to tell you the meaning of a story or the motives of the characters.

It is through emotional interactions that images acquire meaning. The child is learning what an apple is, what love is. She can use words or pictures to convey the feeling of giving mom a big hug and by saying, "Love you." She can symbolize hitting and screaming by saying, "Me mad!" She can also use pretend play to symbolize real or imagined events, such as tea parties, monster attacks, and the like. In addition, a child can now use symbols to manipulate ideas in her mind without actually having to carry out actions. This allows her tremendous flexibility in reasoning and thinking because she can now solve problems in her own mind.

To the degree that they refer to lived emotional experiences, the new words a child acquires become meaningful. The twelve or eighteen months of exchanges the child has already experienced with caregivers and the available world provide a foundation for the emergence of meaningful language. Continuous emotional interaction with others and the world maintains progress throughout life.

This stage of developing ideas and language, which grows rapidly between eighteen and thirty months and continues thereafter, also moves through several levels based on the complexity of the ideas used and how the ideas are used to express wishes or actions or feelings. These include:

- Ideas or words and actions are used together (ideas are acted out, but words are also used to signify the action). Ideas or words are not yet used instead of actions.
- Action words are used instead of actions, and these action words convey intent ("Hit you!").
- Feelings are conveyed through words, but are treated as real rather than as signals ("I'm mad," "I'm hungry," "I need a hug," as compared with "I feel mad" or "I feel hungry" or "I feel I need a hug"). In the first instance, the feeling state demands action and is very close to action; in the second one, the words are more a signal for something going on inside that makes possible a consideration of many possible thoughts and/or actions.
- Words are used to convey bodily feeling states ("My muscles are exploding," "My head is aching").
- Words convey feelings, but they are mostly global feeling states ("I feel awful," "I feel okay."). The feeling states are generally polarized (all good or all bad). These polarized uses of words can also characterize the next stage, when logical bridges are created to link ideas together; if they persist, however, they often indicate a constriction or limitation in the full mastery of using words and connecting ideas together logically.
- Words begin to convey more differentiated feelings ("I feel sad" or "I feel angry") and, therefore, are beginning to represent more fully a specific feeling that is not tied to action. This more differentiated use of words characterizes the relative mastery of this stage and the next one.

Intelligence has now reached the symbolic level. This is when we ordinarily think of intelligence as truly beginning. As we have shown, however, intelligence has already been on a long developmental journey and is now simply reaching a new level. Although we emphasized the acquisition of verbal symbols, which is a cornerstone of many intellectual endeavors, the ability to construct symbols actually occurs in many domains and gives rise to higher levels of intelligence in all of them. This development includes the formation of visual-spatial symbols (the preschooler can build a house and elaborate about what goes on in each

part of it) as well as planned actions, which serve symbolic goals (taking the toy bus from the house to the school to pick up some children).

Now the child is able to solve problems in her mind. She can explore creative and novel possibilities through the manipulation of symbols (i.e., ideas). This new foundation for intelligence, like its antecedents, will be further developed throughout life.

The ability to construct symbols also enables individuals to share meanings. This includes the common use of words and emerging concepts—not only what's "nice" and "not nice," "fair" and "unfair," but a sense of justice and other concepts that can unite groups socially. Symbols also enable new levels of social negotiation. Basic needs, such as dependency, curiosity, assertiveness, and aggression, can be dealt with by larger and larger groups. Preschoolers are still usually better at sharing meanings and symbols with one other person than with large groups of people. At big birthday parties, preschoolers tend either to organize into smaller groups or play on their own in a more parallel way. Over time, however, the ability to use symbols in larger and larger groups emerges.

The sense of self is also reaching a higher level. A sense of "me" and "not me" is forming, now at the level of internal images rather than simply integrated patterns of behavior, as was true at the prior stage. In other words, there is now a "symbolic sense of self" beginning to form. Consciousness is, therefore, reaching an important new level as a symbolic awareness of the world is beginning to complement the presymbolic one, which had been materializing for some time. This symbolic awareness of the world builds on and incorporates the awareness of the world that had already existed. In other words, language does not create conscious awareness. It provides a new way of labeling and expanding consciousness. It builds on a sense of the self and the outer world that is already well established. It now becomes possible to create new realities and new levels of consciousness through manipulating and creating symbols. Fantasies and imagination blossom.

Stage 6—Emotional Thinking, Logic, and a Sense of "Reality"

Another momentous transformation occurs when children learn to connect symbols together logically, making possible logical thinking and re-

lection. We just described how, in addition to constructing new meanings, the child has infused her formal symbols with the meanings already established, to some degree, in earlier and ongoing emotional experiences. In the sixth stage, from approximately thirty to forty months, the child learns to connect these symbols together. She says, "I want to go out and play!" and you say, "Why?" and the child says, "Because it's fun," or "Because I want to go down that slide." Now the child offers reasons for her behavior. "Why are you so mad?" "Because Sally took my toy!" She can combine symbols together to think causally.

The child learns to connect symbols in a variety of contexts, including an understanding of how one event leads to another ("The wind blew and knocked over my card house"), how ideas operate across time ("If I'm good now, I'll get a reward later" or "He was mean to me yesterday; I bet he'll be mean again"), and how ideas operate across space ("Mom is not here, but she is close by"). Ideas can also help explain emotions—"I got a toy so I'm happy"—as well as organize knowledge of the world.

Connecting ideas logically is also the basis for reality testing, because the child now connects experiences inside herself with those outside and categorizes which are which (fantasy versus reality). Her ongoing emotional interactions support this ability to form a category of reality because they continuously put a "me" in contact (through the interactions) with a "not me or you." This ongoing contact with someone who is "not me" provides constant contact with an external reality outside oneself. The emotional investment in relationships enables the child to recognize the difference between her fantasies and the actual behavior of others. While "reality testing" might appear to be a purely cognitive capacity, as we are describing, it requires an ability to organize an emotional sense of self that is distinct from one's sense of others. Such "reality testing" is a critical foundation for logical thinking. Without it, facts are often used to support irrational beliefs.

Logical thinking leads to an enormous flowing of *new* skills, including those involved in reading, math, writing, debating, scientific reasoning, and the like. The child can now create new inventions of her own, such as a new "game," and play games with rules.

General "reasoning" emerges from understanding emotional interactions and is applied to the more impersonal world. For example, cause-and-effect thinking with symbols comes from dealing logically with someone else's intentions or feelings: "When I'm mean, my mom gets

annoyed with me." Once a sense of causality has been established at the symbolic level, a child can understand how the light from the sun causes "day time." A "reality sense" enables us to "think" realistically about many different things. Of course, purely cognitive skills enhance this core ability, but it is founded upon emotional interactions.

The ability to build bridges between ideas leads to a new level of intelligence. The child can apply her new reasoning ability not only to arguing about "why I should watch more TV" (because it's fun) but also to why certain letters make up a word (reading) or why adding numbers together can help you figure out how many apples you have. In other words, the concepts behind most academic abilities depend on this type of logical thinking. We often think about school readiness, intelligence, and academic abilities without regard to a framework for understanding the stages in thinking. However, this fundamental level of thinking is a vital component of intelligence because it is a precondition for all higher levels of intellectual functioning.

New social skills emerge from the ability to connect ideas. The child can now understand why it's important to follow the rules of the group. The child can also participate in forming group rules. These new skills eventually provide the basis for participating in larger groups, communities, and societies, where individuals need both to follow and help define the rules that will enable a large number of people to live safely and securely and solve challenges together. For example, the child can now understand why it's important not to hit (it will hurt someone else or because "I will be punished in the following way"). The child can suggest a "new rule": She gets to watch her show on TV and then her brother gets to watch his show. This type of social problem solving, as indicated, not only enables siblings to get along but enables entire groups and societies to negotiate ways to live and solve problems together.

The sense of self is now defined at a higher level. Understanding the logical bridges between different feeling states enables the child to connect the different parts of what she considers "me" or "you" together at a symbolic level. The mischievous or angry "me" and the nice and happy "me" are understood logically: "When you don't let me do what I want, I'm mad. When you're nice to me, I'm happy and nice back."

Consciousness is also moving to a higher level because there is now a symbolic awareness of one's own feelings: "I'm sad because you were mean to me." This is the beginning of what will be a monumental journey towards higher and higher levels of reflective self-awareness.

Stage 7—Multiple-Cause and Triangular Thinking

From simple causal thinking children progress to recognizing multiple causes, often experiencing a rapid growth in this capacity between four and seven years of age. If someone won't play, instead of just concluding, "She hates me," the child can say, "Maybe she has someone else she wants to play with today. Maybe her mother is making her come home after school." She can set up multiple hypotheses. Or, "Maybe she doesn't want to play with me because I have always played Nintendo. Maybe if I offer to do something else she'll want to come over." The child is now becoming a multiple-cause thinker in many contexts. In school, she can now look at multiple reasons for the Civil War or why a storybook character is upset. With peers, she can compare two friends—"I like Sally better than Stephanie because she has great toys." Multiple-cause thinking enables her to engage in "triangular" thinking. At home, if mother is annoyed, the child can try to make her mother jealous by going to her father and being coy with him. She can become friends with Sally so as to get to know Sally's friend Judy. She can figure out how a character in a book pretended to like her vegetables so that she could get dessert.

The child becomes a more flexible thinker as a result of multiple-cause thinking. Eventually she comes to understand more intricate plots in literature, the multiple causes for historical events, and a physical phenomenon that requires a scientific explanation. Therefore, multiple-cause thinking constitutes a higher level of reflective thinking in all spheres.

To learn multiple-cause thinking a child not only needs to have learned the earlier levels discussed above, she needs to be able to invest emotionally in more than one possibility. For example, she may not be able to consider a second friend as a possible play partner if she is too dependent on the first friend. She may believe that she will "lose" that friend unless she plays only with her. She may not be able to woo her father into playing with her, or even consider this possibility if she is too anxious about losing her mother.

The child can now also understand her own family dynamics through relationships among different people rather than just by whether her own needs are met. For example, it's not simply a question of whether her mother is paying enough attention to her but how she competes with a sibling when they both want mother's attention. Similarly, she can negotiate social triangles and figure out that another child may prefer to play with someone else on a given day without necessarily disliking her.

As the child's intelligence and social skills are advancing, her sense of self is expanding to include new horizons as well. She can now begin to look at herself as competitive and needy, mischievous and funny (multiple dimensions) all at the same time. Her consciousness is gradually developing an awareness of how she can employ these different facets of herself in a variety of contexts—whether it's to compete with her sibling or to recruit a new friend at school.

Stage 8—Gray-Area, Emotionally Differentiated Thinking

The ability to engage in emotionally differentiated thinking enables a child to understand the different degrees, or "relative" influence, of different feelings, events, and phenomena. For example, often between ages six and ten she is rapidly learning that she can like other kids or be angry with them (and vice versa) to different degrees. In school, she not only looks at multiple reasons for events but can weigh the degree of their influence as well. "I think opinions about slavery were a lot more important than where people lived (the North versus the South) in causing the Civil War." With peers she can compare feelings in a graduated way: "I like Sally a lot more than Stephanie because she is much nicer to me when I'm upset."

Gray-area thinking enables children to comprehend their roles in a group and deal with increasingly complex social systems ("I'm third best at spelling and fifth best at telling stories"). All future complex thinking requires mastery of this stage, whether it involves looking at the relative influence of variables in science and math or understanding one's social group and society.

Intelligence now expands to include a more gray-area understanding of the world. She now not only can look at multiple reasons for an event but can also weigh how much each factor contributed. She can do the same with her own feelings (a little, a medium amount, or a lot of anger). Her reflectiveness, therefore, includes a new appreciation of both the world and herself.

Socially, the child is now truly able to negotiate the politics of the playground. She can figure out and participate in multiple social hierarchies involving everything from power or dominance and submission to

athletic skills, academic abilities, and likeability. New ways to solve problems, especially group problems that involve multiple opinions, are now possible because the child can compromise in the "gray area." The ability to operate in social hierarchies and employ gray-area negotiation strategies creates the foundations for participating in the larger social reality of one's community, society, and culture.

The sense of self is now expanding to include a sense of being a member of a social group. If there is sufficient security in the family, so that the child can take her "chicken soup" for granted, she can move out into the social group with full vigor and begin defining herself more and more through her peer relationships and these newly understandable social hierarchies. Her sense of self, therefore, is achieving a new level of organization and a truly social self (in comparison to the earlier family-defined self) is emerging. This emerging sense of self in the social group, however, is often initially quite rigid and polarized: "I'm the worst soccer player (or dancer)!" Interestingly, many social groups, as we will discuss in Chapter 13, are organized around rigid rules and hierarchies rather than reflective processes and institutions.

Similarly, consciousness is also broadening. The comprehension of social hierarchies and relativistic intellectual concepts leads to new levels of awareness and self-awareness. The child is conscious, not only of herself in the group but also in a relativistic sense in the world. It's not surprising, therefore, that we see greater concern with life and death at this time as the child becomes aware of the cycles of life. As indicated, children may attempt to handle this broadening of their consciousness by becoming temporarily more rigid and compulsive. However, this is a temporary phase, adaptive in a sense, a way to slow down the progress a bit and so digest the new awareness.

Stage 9—A Growing Sense of Self and an Internal Standard

By puberty and early adolescence, more complex emotional interactions and thinking build a ninth level—an internal standard based on a growing internal sense of self. This process, which builds during the adolescent and adult years, can begin as early as ten or twelve years as children gradually create a more defined sense of self. That sense of self, in turn,

constitutes an inner standard by which to judge experience. For example, they can say for the first time, "I shouldn't be so angry because the insult wasn't that great." Similarly, they can look at peers who are doing something naughty and say, "I shouldn't do that because it isn't the right thing for me to do. It may be okay for them." A child aged from ten to twelve and beyond can have a hard time on the playground and still feel like a good person. In contrast, an eight-year-old might have felt like a bad person instead of being able to apply her inner standard. Using that internal standard, a child can now look at history and say, "I agree with the North (or the South) for the following reasons." Or, "In the First World War, I think that when people behaved that way, they were exercising bad judgment."

At this stage, children become able to make more inferences. Inferences mean thinking in more than one frame of reference at the same time, or creating a new idea from existing ones. To use more than one frame of reference, one needs to have an "agency" that can do the looking and relating. One of the two frames of reference that are being compared must be based on an organized sense of self that is the product of meaningful experience. Intelligent inferences involve all the developmental levels we have been describing as well as emotionally meaningful experience in the sphere of knowledge where the inference is being made. Both are required. Experience and knowledge in the area where the inference is made are necessary for sophisticated inferences rather than naive ones.

Cognitive, educational, and learning theory has not been able to develop an adequate model to figure out or explain how to promote the highest levels of reflective thinking because it has not focused on the role of emotion. In other words, the highest levels of thinking require combined emotional and cognitive development because they involve comparing frames of reference, which have to be based on ongoing emotional experiences and a complex internal sense of self.

The new ability to think in two perspectives—objective reality and personal opinion—at the same time separates individuals who remain somewhat more concrete (they haven't yet mastered this level) from those who have. For those who have, the door is now open to the higher levels of intelligence and reflectiveness that will be characteristic of adolescent and adult thinking.

During the early adolescent years, the ability to consider the future as well as the past and present broadens the sense of self, an internal stan-

dard based on it, and the hypothesis-making abilities that lead to inference and other types of creative thinking. Probabilistic thinking about the future, however, can be more readily applied to areas such as math and science than others, such as one's personal plans. Emotionally investing in the future comes in the next stages.

From a social point of view, values and ideals can now be constructed, debated, and argued. To be sure, there will be all kinds of trial balloons as teenagers experiment and argue for cultural norms that are different from those of their parents. Nonetheless, such debates signal a whole new level of social and cultural understanding. It creates the foundations not only for understanding values and ideas and pursuing them but also for investing institutions with stable personal beliefs that can sustain whole societies; for example, concepts and institutions that support justice.

The ability to reflect an internal sense of self and standard may be viewed as one of the basic capacities required to support values and institutions commonly associated with representative democracies. Such forms of government require a certain percent of the population to invest in abstract principles such as justice and the institutions that support it ("the consent of the governed," according to Jefferson). Only individuals who can think from an internal standard and sense of self can invest in abstract principles and institutions. Individuals unable to do this are more likely to adhere to a specific leader or a concrete belief.

The sense of self now embraces a new agency as values and ideals gradually become an integral part of the self. The self has also expanded to include the two dimensions we've been discussing—the one that operates in the emotions of the day-to-day events, and the one that can evaluate these events against a longer term based on a more integrated sense of the self over time. This creates an entirely new level of consciousness, one in which self-observation is possible. Individuals can now evaluate how they feel, what they've done, and plan to change and improve. They can also use this new level of reflective awareness for self-directed criticism and anger as well as to praise or invigorate themselves.

If children remain mired in all-or-nothing thinking, they are likely to take extreme positions about themselves. On the other hand, if they've progressed adaptively through the different stages, through gray-area thinking, they can use this new self-observing ability to take an honest look at their behavior and then plan accordingly. Because this process is

just beginning (as are values and cultural norms), there will be lots of experimentation. We will see a mixture of harsh or extreme attitudes alongside what appear to be very reasonable ones. Nonetheless, an entirely new level of self-reflection and, therefore, conscious awareness of the world is now possible.

THE STAGES OF ADOLESCENCE AND ADULTHOOD

The nine stages we have been describing constitute basic functional emotional development and create the very "structure of thinking." From childhood on, these skills are applied to an ever broadening range of experiences. In adolescence and adulthood, we take the abilities for multiple-cause and gray-area thinking, and an internal sense of self and standards, and apply these to an even more ever-widening world. In adolescence, this means biological changes, new emotions and social networks, new interests, and future-oriented probabilistic thinking about education and work. In adulthood, marriage or intimate relationships, having children, and/or career challenges create new demands for reflective thinking. Some of us can reflect maturely in some areas, such as our work problems, but not in family issues. Some of us can apply complex thinking skills around family, but not around work. Some of us can do it in scholarly work, but not in politics. We vary in how well we apply our thinking abilities because they are dependent on the range of our emotional experiences, the breadth and complexity of our growing sense of self, and the scope and depth of our reflective abilities.

As each one of us is simultaneously increasing the complexity and level of integration of a sense of self—for example, a self that can embrace intimacy with one's own children or spouse—we also broaden and further integrate our internal standards. This includes looking at actions from the perspective of not just oneself and family but community, culture, and society, and ultimately the world community. Each of these broader applications leads to a higher level of reflective thinking.

Thinking, as well as its content, changes. For example, the ability to empathize simultaneously with one's children and their feelings, one's spouse and his or her feelings, and, at the same time, to be aware of one's own feelings without overidentifying with those of one's children

or spouse is not simply a very high level psychological achievement but a high level of abstract, reflective thinking. Just as thinking of a sense of self and internal standard is at once an emotional and cognitive ability, similarly at each higher level of reflective thinking the building blocks are at once emotional and cognitive. At these higher levels both are required for true reflective thinking. The reason we see so much pseudo-reflective thinking at seemingly high levels, and why truly reflective thinkers are so rare, is because of the difficulty in mastering these combined cognitive and emotional skills.

The next seven stages will be described very briefly. Although a great deal of interest has been shown in the stages of adolescence and adulthood—for example, the work of Erik Erickson, as well as many others³⁰—there is a great deal more to learn about these phases of human development.

Stage 10—An Expanded Sense of Self

During this stage, which begins in early and middle adolescence, the ability to reflect by using an expanding internal standard and a growing internal sense of self encompasses new learning experiences, including physical changes, sexuality, romance, and closer, more intimate peer relationships, as well as new hobbies and tastes in art, music, and dress. Some adolescents become fragmented or rigid and constricted in an attempt to cope with all these challenges. They may attempt to return to an earlier, narrower sense of self. In other words, as the complexity of new challenges and experiences expands, an individual may lose the ability to use gray-area, multiple-cause thinking, or an internal standard. When an adolescent is able to incorporate new challenges into an expanding sense of self, however, he or she gains broader reflective abilities. No matter how good cognitive skills are (such as mathematical reasoning), a person's world can be narrowed by naïve or rigid thinking that ignores the full complexities of life.

As the self is expanding to include these new experiences, intelligence is also broadening to include a greater appreciation of the world along with the new levels of reflection. For example, literature can be understood as an exploration of complex relationships between the characters in a novel or drama. Motives for historical events can be

more fully understood. A broadening social reality facilitates an appreciation of culture and society.

As a consequence of these changes, one's consciousness and reflectiveness is reaching higher levels. For example, one can *think about thinking and observe one's own patterns of thought and interaction* ("I tend to be quick-witted with the guys but slow-thinking with girls."). This is no small feat. Used adaptively, thinking about thinking creates new insights about oneself and others. It can also, however, lead to overload and fragmented thinking. Nurturing support and the successful negotiations of earlier stages support the adaptive pathway.

Stage 11—Reflecting on a Personal Future

A significant development in late adolescence and early adulthood is an ability not only to think about the future but also to become emotionally invested in one's personal future. Although the ability for probabilistic thinking often begins in early adolescence, the ability of a teenager to apply this skill to her own life becomes more firmly established as she becomes emotionally invested in her future: leaving home, going to college, getting a job, and other such concerns. Without such an investment, probabilistic thinking may not fully develop. Too much anxiety about the future will discourage reflection and restrict cognitive and emotional development. The need to invest emotionally in the future to develop probabilistic thinking in full is another illustration of how emotional and cognitive development work together.

Investing in future-oriented probabilistic thinking is not only needed for mathematical and scientific reasoning, it also enables an appreciation of social patterns. One can look at the implication of social, political, economic, and cultural patterns for the future in relationship to the past and present and future. This not only helps one plan but also leads to a more sophisticated and intelligent analysis of history, culture, and society. It enables one to be a more intelligent voter and economic participant. One's sense of self now embraces a sense of the future and a more integrated sense of the past as well as the immediate present. At the same time, consciousness expands to include this new perspective on time as well as a continuously growing perspective on one's personal history and future.

This perspective will continue growing as the psychological investment in the future (one's children's future, one's retirement, the future of the world) becomes more important.

Stage 12—Stabilizing a Separate Sense of the Self

This stage of early adulthood involves separating from the immediacy of one's parents and nuclear family and being able to carry the warmth, security, and guidance of those relationships inside oneself. It involves stabilizing the sense of self and one's internal standards so that one can always set internal limits, use good judgment, and care for oneself, even when operating outside the immediacy of one's own nuclear family and/or related institutions.

What was earlier a variable or relatively unstable sense of self and internal standard now must be more stable to hold firm in the face of growing independence at college or work. It also must be applied to exploring intimate relationships more deeply.

Without such a stable, broad inner framework, intellectual judgments and reflective thinking tend to be naïve, limited, or fragmented. For example, young adults who retreat back into earlier adolescent modes of being may not be able to appreciate the nature of long-term, intimate relationships with a partner or a future family, let alone reflect upon them. A whole realm of life, literature, and culture that deals with intimate adult relationships, careers, and independence from parental figures may remain outside of, rather than under, the perspective of one's reflective thinking.

Young adults can now often make judgments that "thoughtfully" incorporate and accept or reject the standards of their caregivers. The standards of one's caregivers, however, are not simply their values and judgments, but, through their good offices, the history of their culture as well as one's own—that is, one's heritage. There is, therefore, greater independence from daily reliance on one's nuclear family, greater investment in the future—mobilized in the prior stage—and greater ability to carry one's past inside oneself as part of a growing sense of self and internal standard. This stage ushers in the beginning of a long process that involves reflective thinking and that can use the past, present, and future in a relatively more independent manner.

Stage 13—Intimacy and Commitment

The ability for commitment and intimacy now builds on all the earlier stages of emotional development. It includes taking the initial steps involved in life's major decisions. It calls on all the prior stages as well as new depth in the ability to reflect upon relationships, passionate emotions, and educational or career choices. This challenge can deepen and further stabilize an expanding sense of self and broaden one's thinking (for example, with new levels of empathy). For example, the challenge of loving another person over a long period of time involves engaging in a relationship with deepening intimacy and growing respect for unique differences. This is not an easy feat, and it can lead to a narrowing of emotional investments, rigidity, and fragmentation or new levels of reflectiveness.

Reflective thinking achieves a yet higher level as a new set of time and space dimensions are incorporated into educational, career, and personal relationships. For example, involvement with a potential mate and having a family of one's own inspires a shift from relative states of emotional immediacy to increasingly longer-term commitments. Decision-making involves greater lengths of time and more stable long-term commitments to different types of interpersonal space (work and school environments, setting up homes as opposed to living in dormitories or apartments). With this new level of reflection we may also begin seeing longer-term political and religious values consolidate, although these will often form and consolidate for some time.

Stage 14—Creating a Family

For those who choose to create a family of their own that includes raising children, the ability to reflect broadly and wisely is challenged by the experience of raising children, without losing closeness with one's spouse or partner. An even harder challenge, however, is empathizing with one's children without overidentifying or withdrawing. At each stage of a child's development there is an opportunity for caregivers to overidentify, pull away, or empathize with a balance of caring, understanding, and guidance. Meeting this challenge can significantly expand, deepen, and ripen one's reflective skills and sense of self. At each

stage in the child's life it enables one to rework issues in one's own development, as well as construct new empathetic capacities at a level of intimacy and depth, perhaps not attained in any other relationship. On the other hand, it can make a person pull back, wall off parts of the self, and become fragmented. As with all new demands and challenges, there is the risk that thinking will become concrete, narrow, or rigid when challenges are too great.

An adult with all the early stages in place can now develop a new level of consciousness and reflective thinking because of the growing ability to view events and feelings from another individual's perspective, even when the feelings are intimate, intense, and highly personal. In other words, the empathy learned through taking care of children opens up new dimensions of feelings that were not possible at earlier stages of empathy. As this ability develops, one is able to generalize it and look at and empathize with the goals, needs, and perspectives of other communities and cultures while maintaining a strong sense of one's own cultural heritage, social values, and commitments.

Stage 15—Changing Perspectives on Time, Space, the Cycle of Life, and the Larger World: The Challenges of Middle Age

Middle age brings with it new perspectives and the need for an expanded, reflective range. Often, the experience of accompanying one's child through various stages of development, including possibly grandchildren, has brought new insights into one's own developmental journey. Ideally, one has deepened one's relationship with a spouse or partner. During this stage, one is propelled into having to think about the next steps in work and family life. Unrealistic or wishful expectations and earlier fantasies about attainments are tempered with an appreciation of accumulated reality-based experience and wisdom.

One's perspective of time is also changing. As Jaques³¹ has pointed out, during the middle age years, the sense of time changes. The future is no longer infinite. Relative to one's own life, time appears to pass more quickly. In addition, one's allegiance often extends more and more into the world community and global concerns. When emotional investment moves beyond family, local community, or even nation, both

the sense of self and consciousness further expand. Most important, however, this stage creates an ability to appreciate a new social reality, the global or world group. As we will discuss in Chapters 13 and 14, technological changes are challenging us all to embrace the global group as the new unit of survival.

Therefore, at this stage, the elements of time and space take on an important new dimension that leads to yet a higher level of reflective thinking. If these adaptive processes do not occur, however, varying degrees of depression, pessimism, anger, rigidity, and/or "escapes" back to earlier themes are possible.

As part of this stage, individuals frequently (either at a conscious or intuitive level) have a sense of where they are in their life's journey, including their goals. Implicit in this appraisal is a sense of one's own patterns in relationships to others, such as family and career. Most individuals operate within identifiable patterns related to their own prior experiences. For example, one gifted scholar shared that she had always tried to please a demanding, competitive, and "even more gifted" father and had operated that way throughout her seemingly successful adult life. In trying to please authority figures, however, she had inhibited her own creativity for fear of revealing her true competitive feelings towards those authority figures, as well as revealing her fear of failing. She secretly fantasized that after absorbing all the wonderful guidance from these "knowing" authorities, she would have her day in the sun. Now, in midlife, however, she was sensing that the very pattern she had elected to reach her goals was not leading her there and that the prize she was seeking was not available from the strategies she had elected.

To be sure, there were many other underlying dynamics related to this pattern. Illustrative of the point being made here, however, is the fact that this talented individual was now becoming depressed over the realization of the limitations of her own strategies and the related sense that the prize she had sought would not be forthcoming. This individual experienced at least certain elements of her pattern consciously. Others experience it at more intuitive or less conscious levels. Regardless of the way it's experienced, however, it often contributes to a sense of loss, which can also lead to sadness and depression.

Alternatively, however, this "awareness," which can be particularly poignant in midlife because the future is now finite rather than infinite (in a relative sense), can lead to a reappraisal and a decision to find an

adaptive pathway outside one's "pattern." Interestingly, this type of adaptive solution often involves a reappraisal of one's goals as well, since the original goals, like the pattern associated with them, may have been partially colored and limited by a variety of previous experiences, including conflicts, and childlike solutions to family dramas. The relatively new pattern and goals, based on a reappraisal, can lead to a surprisingly fresh and robust direction for life's next stages. The reflective skills involved in such a reappraisal—that is, the ability to understand one's own patterns and make a "midcourse" adjustment—is an important component of an adaptive resolution of this particular stage.

During this stage, the cycle of life, including death, can also now be thought about in a new emotional manner. This further definition of the sense of time and space and one's emotional investment in community, society, and the world community can lead to an entirely new perspective of one's place in the world.

Stage 16—Wisdom of the Ages

The later stages of aging can be a time committed to true reflective thinking of an unparalleled scope or a time of retreat and/or narrowing. As Erik Erikson has pointed out, aging is a time of potential generativity.³² It brings with it the possibility of broader wisdom, free from many of the self-centered and practical worries of earlier stages.

However, preoccupation with one's changing physical status, or a narrowing of interests and perspectives, accompanied by fear, anxiety, and depression, can lead to limited thinking. The decline of physical abilities, including memory and the ability to sequence actions and information, and the fear of terminal illness can either overwhelm or lead to further growth.

If memory loss and sequencing problems are not severe, the aging process opens up new vistas. Life is much more finite. Goals have been either met or not met. Grandchildren or great grandchildren may be a part of one's life or on the horizon. A spouse or partner may be an even deeper ally in life's travels. One may be able to comprehend the cycle of life in a richer, fuller manner.

When the aging process and changes in one's own body become dominant, the appreciation and acceptance of the life cycle is juxtaposed with

the possibility of depression and withdrawal. New, almost impossible to anticipate feelings and experiences are generated. Time, space, person, and self have new dimensions and meanings. In other words, aging can bring not just a new insight but what some have called wisdom, an entirely new level of reflective awareness of one's self and the world.

This quick journey has described the transformations of emotions throughout life. During each of the sixteen stages, we observe the relationship between emotions, intelligence, and reflective thinking (see Table 2.1 for a brief overview).

But even more intriguing than attempting to figure out how each individual develops emotions and intelligence is the question of how this process first evolved millions of years ago. In the next section, we will present support for our hypothesis that cultural patterns dating back to prehuman societies and that support the developmental steps just described have been passed on by each generation teaching the next generation. We will trace how different species of primates, prehumans, and, eventually, humans, over millions of years, achieved mastery of progressively higher levels of emotional transformation and intelligence.

TABLE 2.1 Overview of the Transformation in Emotional and Intellectual Growth

<i>Functional Emotional Developmental Level</i>	<i>Emotional, Social, and Intellectual Capacities</i>
Shared attention and regulation <i>(from birth on)</i>	Pleasurable interest in sights, sound, touch, movement, and other sensory experiences Leads to looking, listening, calming, and awareness of the outer world and simple patterns
Engagement and relating <i>(from 2 to 4 months on)</i>	Pleasurable feelings characterize relationships. Growing feelings of intimacy
Two-way intentional, emotional signaling and communication <i>(from 4 to 8 months on)</i>	A range of feelings become used in back-and-forth emotional signaling to convey intentions (e.g., reading and responding to emotional signals); the beginning of "cause and effect" thinking

TABLE 2.1 *(continued from previous page)*

<i>Functional Emotional Developmental Level</i>	<i>Emotional, Social, and Intellectual Capacities</i>
Long chains of co-regulated emotional signaling, social problem solving, and the formation of a presymbolic self <i>(from 9 to 18 months on)</i>	<p>A continuous flow of emotional interactions to express wishes and needs and solve problems (e.g., to bring a caregiver by the hand to help find a toy):</p> <ol style="list-style-type: none"> Fragmented level (little islands of intentional problem-solving behavior) Polarized level (organized patterns of behavior express only one or another feeling state, e.g., organized aggression and impulsivity or organized clinging, needy, dependent behavior, or organized fearful patterns) Integrated level (different emotional patterns—dependency, assertiveness, pleasure, etc.—organized into integrated, problem-solving emotional interactions such as flirting, seeking closeness, and then getting help to find a needed object)
Creating representations, symbols, or ideas <i>(from 18 months on)</i>	<p>Experiences, including feelings, intentions, wishes, action patterns, etc., are put into words, pretend play, drawings, or other symbolic forms at different levels:</p> <ol style="list-style-type: none"> Words and actions used together (ideas are acted out in action, but words are also used to signify the action) Somatic or physical words are used to convey feeling state ("My muscles are exploding," "Head is aching") Action words are used instead of actions to convey intent ("Hit you!") Feelings are conveyed as real rather than as signals ("I'm mad," "Hungry," "Need a hug" as compared with "I feel mad" or "I feel hungry" or "I feel like I need a hug"). In the first instance, the feeling state demands action and is very close to action and in the second one, it's more a signal for something going on inside that leads to a consideration of many possible thoughts and/or actions Global feeling states are expressed ("I feel awful," "I feel OK," etc.) Polarized feeling states are expressed (feelings tend to be characterized as all good or all bad)

TABLE 2.1 (continued from previous page)

<i>Functional Emotional Developmental Level</i>	<i>Emotional, Social, and Intellectual Capacities</i>
Building bridges between ideas: logical thinking (from 2½ years on)	Symbolized or represented experiences are connected together logically to enable thinking. This includes the ability for: <ol style="list-style-type: none"> Differentiated feelings (gradually there are more and more subtle descriptions of feeling states—loneliness, sadness, annoyance, anger, delight, happiness, etc.) Creating connections between differentiated feeling states (“I feel angry when you are mad at me”) and logical thinking (“The letters ‘C,’ ‘A,’ and ‘T’ spell CAT”).
Multicause, Comparative, and Triangular Thinking	Exploring multiple reasons for a feeling, comparing feelings, and understanding triadic interactions among feeling states (“I feel left out when Susie likes Janet better than me”).
Emotionally differentiated gray-area thinking	Shades and gradations among differentiated feeling states (ability to describe degrees of feelings around anger, love, excitement, love, disappointment—“I feel a little annoyed”).
Intermittent reflective thinking in relation to a sense of self, and an internal standard	Reflecting on feelings in relationship to an internalized sense of self (“It’s not like me to feel so angry” or “I shouldn’t feel this jealous”).
Reflective thinking with an expanded self; the adolescent themes	Expanding reflective feeling descriptors into new realms, including sexuality, romance, closer and more intimate peer relationships, school, community, and culture, and emerging sense of identity (“I have such an intense crush on that new boy that I know it’s silly I don’t even know him”).
Reflective thinking with an expanded self; considering the future	Using feelings to anticipate and judge (including probabilizing) future possibilities in light of current and past experience (“I don’t think I would be able to really fall in love with him because he likes to flirt with everyone and that has always made me feel neglected and sad”).

(continued on next page)

TABLE 2.1 (continued from previous page)

<i>Functional Emotional Developmental Level</i>	<i>Emotional, Social, and Intellectual Capacities</i>
Reflective thinking with an expanded self; the adult years	Expanding feeling states to include reflections and anticipatory judgment with regard to new levels and types of feelings associated with the stages of adulthood.
Reflective thinking and the separation, internalization, and stabilization of the self	The ability to separate from, function independently of, and yet remain close to and internalize many of the positive features of one’s nuclear family and stabilize a sense of self and internal standard.
Reflective thinking and commitment, intimacy, and choice	Intimacy (serious long-term relationships)
Extending the self to incorporate family and children	The ability to nurture and empathize with one’s children without over-identifying with them.
Middle age	The ability to broaden one’s nurturing and empathetic abilities beyond one’s family and into the larger community. The ability to experience and reflect on changing perspectives of time and space and the new feelings of intimacy, mastery, pride, competition, disappointment, and loss associated with the family, career, and intrapersonal changes of mid-life.
The aging process	The ability for true reflective thinking of an unparalleled scope or a retreat and narrowing of similar proportions. There is the possibility of true wisdom free from the self-centered and practical worries of earlier stages. It also, however, can lead to retreat into one’s changing physical states, a narrowing of interests, and concrete thinking.

A TIMELINE FOR HUMAN EVOLUTIONARY DEVELOPMENT

In recent years, paleoanthropologists have made striking discoveries that suggest the highest capacities we associate with human functioning, such as symbolic and logical thinking, emerged gradually and earlier than was previously thought. The saga is still unfolding, and evidence is mounting that supports this picture. For example, it has just been reported that an animal bone between 1.4–1.2 million years old was found in the Kozarnika cave in northwest Bulgaria. The bone has a series of parallel lines engraved in it, which, according to Dr. Jean-Luc Gaudelli of the University of Bordeaux, “were not from butchering; in this place there is nothing to cut. It can’t be anything else than symbolism” (BBC News Online, March 16, 2004).

Discoveries such as this support the hypothesis regarding symbol formation during the course of evolution presented in this work. We have suggested that symbol formation results from a series of stages of affective transformations, which we have described as functional/emotional developmental levels. We have further suggested that although biological foundations were necessary for this progression, the *sufficient* condition for the steps leading to symbol formation was culturally transmitted caregiving practices from one generation to the next, across species, over millions of years. These culturally transmitted learning processes enabled new generations to master more complex stages of affective interaction leading to symbol formation. If this hypothesis is correct, the fossil record should reflect a gradual process of symbol formation, the signs of its early stages discovered over time. The alternative hypothesis, that genetic mutations were the *sufficient* condition for symbol formation, would lead one to expect the sharp emergence rather than the gradual unfolding of symbolic artifacts.

Therefore, the current findings support our hypothesis of a continuously unfolding biological/cultural process, in which formative caregiving practices were passed down from one generation to the next. In the future, we can expect to hear of further discoveries that show the development of our higher capacities was even more gradual and emerged even earlier than the argument presented in this book, which is based on current paleoanthropological data. On the basis of this existing data, however, we can now outline, in general and schematic terms below, and discuss more fully in the next section, the timeline of the broad trajectory of *f/e* developmental capacities and related abilities for symbolic thinking, with a few examples that characterizes human evolution:

(I) and Elements of
(II) and (III)
Attention and
self-regulation and
with elements of
engaging and signaling

tamarins, marmosets, and other mammals
—e.g., marmoset and tamarin infants spend a lot of time looking at their caregivers’ faces and staring into their eyes, and they engage in much back-and-forth vocalizing. As the infants grow older, they spend more and more time looking at their caregivers’ faces and staring into their eyes. Much vocalizing goes on during these episodes of shared gaze, and when it is time to be weaned, the infant can be seen calling for food; the caregiver responds by slowly extending something to eat.

(II) and Early (III)
Engaging and relating
and early signaling

rhesus monkeys and other mammals
—e.g., a rhesus baby spends a lot of time snuggling into its mother’s body and looking keenly at her face; it visibly relaxes and vocalizes happily while being rocked, and rhythmically moves its arms and legs. As adults, rhesus monkeys use back-and-forth emotional signaling to deal with danger, aggression, assertiveness, etc.

(III) and Early (IV)
Two-way purposeful
affective interaction
and communication

baboons and other mammals
—e.g., baboon infants engage in back-and-forth emotional signaling with their caregivers. An infant might happily vocalize, receive the same vocalization from its caregiver, and then make the vocalization again. Recent research has shown that, as adults, baboons engage in extremely subtle back-and-forth signaling in both male-male and male-female greetings whereby they work out such matter as friendship, mating, and coalitions.

(IV)
Co-regulated affective
signaling and shared
social problem solving

H. erectus (2–.4 mya)
H. habilis (2–1.5 mya)
Australopithecines (5.3–1.4 mya)
Ardepithecines (5.8–4.4 mya)

chimpanzees, bonobos and other primates
—e.g., chimpanzees in the wild engage in organized hunting parties, demonstrating a sophisticated understanding of how the other hunters will behave in any given situation as well as how the different species of prey will behave. Particularly striking is the amount of complex emotional communication that is involved. Through gestures, body movements, head nods, and facial expressions, the hunters coordinate their actions and signal to one another who is to do what and when.

(V)
Creating ideas
or internal
representations;
symbolic and
linguistic abilities

Archaic *H. sapiens* and Early Moderns
(600,000–60,000 years ago)

—e.g., over 300 fragments of pigment, believed to be between 350,000 and 400,000 years old, were found in a cave at Twin Rivers, in Zambia. These pigments had been ground up into a powder and ranged in color from brown to red, yellow, purple, blue, and pink. Paleoanthropologists believe that they were used for ritual body painting, and perhaps, for cave painting. That is, current evidence points to the fact that *Archaic H. sapiens* were mastering, through long and complex affective interchanges, various elements of presymbolic communication and were even beginning to use symbols to convey abstract thoughts and feeling states.

(VI)
Connecting
ideas together;
Logical Thinking

H. sapiens sapiens
(Approximately 130,000 years ago)

—e.g., evidence that early modern humans were at least at the stage of beginning to build bridges between their ideas and to think logically, if not higher, is provided by the first colonization of Australia that took place about 60,000 years ago, which required them to build some sort of crude transport to cross the sea. Operating in this kind of complex group endeavor would have required the ability to perceive connections between natural events and plan their actions accordingly.

(VII-VIII)
Multi-causal and
gray-area
differentiated
thinking

Magdalenian Period (12,000–8,000 B.C.)

—e.g., the Magdalenians were figuring out how to adapt to their hostile environment with more complex kinds of shelters and more protective types of clothing. Not only did they likely experiment with different kinds of structures, but they also experimented with different materials and techniques for fashioning cooking pots and for making protective clothing out of animal skins. Such technological advances reveal a flexible form of abstract reasoning. The emergence of settlements at the end of the period also indicates that they were mastering the sort of gray-area thinking in which one comprehends one's role in a group and can deal with increasingly complex social systems.

(IX-X)
Thinking according
to an internal
standard and
growing sense of self

Ancient Civilizations (3,500–72000 B.C.)

—e.g., individuals in the Sumerian state were starting to think of their family's rights, and what sorts of public actions were available to them to avenge transgressions. Laws invested with our internal standards were instituted to ensure that women and vulnerable members of the society were protected by the State. Accomplishing this level of social development requires that the individuals involved master thinking from an internal standard and acquire a more integrated sense of self. There are different degrees here. At a fairly concrete level, the shared sense of reality that binds together the members of a group may simply be based around common words and concepts. At a more abstract level, a shared sense of reality may be grounded in institutions and practices that support a shared system of values.

(XI-XII)
Reflective thinking
on the future and
an expanded concept
of the self

Ancient Greece (6th–3rd century B.C.)

—e.g., in sixth century Miletus, thinkers such as Thales and Anaximander began to develop the first concept of *science*: i.e., the first attempt to explain natural phenomena empirically. These early scientific advances were later followed by remarkable advances in abstract thought, e.g., in the development of metaphysics, logic, mathematics, and geometry, as well, of course, as the elaborate forms of ethical, aesthetic, and political theories found in Plato, the Pythagoreans, and Aristotle. These *fl/e* advances are also reflected in the creation of the *Polis*: the city-state that was based on the idea that people should live in a community of individuals who were all conscious of their shared interests and common goals, and who would manage collective concerns by debating possible courses of action in a public setting. In order to reach consensus through public decisionmaking forums, individuals have to be able to recognize that there are different degrees of satisfying their interests and must also reconcile their personal wishes with the larger needs of a community that now includes members that one is not tied to by blood or possibly even customs.