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# ARTICLE

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## Infant Sensory Integration





# EMOTIONAL DEVELOPMENT OF BABIES AND YOUNG CHILDREN



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ROBUST EMOTIONAL DEVELOPMENTAL FOUNDATIONS ARE ESSENTIAL FOR MENTAL HEALTH THROUGHOUT THE LIFESPAN, ENABLING US TO FEEL SAFE, SECURE AND UNDERSTAND OURSELVES. THEY ARE VITAL FOR HEALTHY RELATIONSHIPS WITH OTHERS, AND ENABLE US TO MANAGE OUR ANXIETY AND REGULATE OUR BEHAVIOR. AS EMOTIONAL DEVELOPMENT UNFOLDS, WE BECOME MORE RESILIENT, ARE ABLE TO OBJECTIVELY TEST REALITY, HAVE EMPATHY AND THINK ABSTRACTLY. OUR ABILITY TO REMAIN CALM AND FOCUSED IN THE FACE OF STRESSORS, AND DEAL WITH CONFLICT DETERMINES OUR CAPACITY FOR MATURE, HEALTHY, INTIMATE RELATIONSHIPS IN ADULTHOOD.

Emotional development begins at birth. We know that babies are particularly sensitive to their relational environment, that early attachment is critical for neurological development and the vehicle for creating learning interactions. Therefore, the foundation for emotional life is built on the ability to attain and sustain a co-regulated interaction with primary caregivers. This in

turn sets the stage for the infant being able to process sensation from their bodies, take in the sights and sounds from the environment and form perceptions. These perceptions form the basis of cognitive development.

Early experiences have a great impact on the development of the baby's physiological systems. The most rapid period of brain weight gain occurs during the 3 months before, and in the first 6 months after birth. In the first two years of life there is particularly rapid brain growth.

A baby does not do this alone but co-ordinates his system with those people around him. During this period the pattern of baby's attachments to their parents/care-givers becomes established. The nature of the baby's interactions with others therefore plays a fundamental role and will have a lasting effect on their neurological development (Schorer, 2000) and later functioning (Murray, 2014).

Therefore, what parents/caregivers do naturally and intuitively in their moment-to-moment interactions, is vitally important in fostering their baby's development. Well managed babies come to expect a world that is responsive



to feelings, and helps to bring intense states back to a comfortable level, through the experience of having it done for them, they learn how to do it for themselves. Babies of depressed mothers adjust to low stimulation and get used to a lack of positive feelings, and babies of agitated mothers may stay over aroused and have a sense that feelings “explode out of you” and that there is not much you or anybody else can do about it, or they might switch off their feeling entirely in order to cope (Gerhardt, 2004). In the case of well-managed babies, a predictable pattern emerges, which becomes the basis of what Bowlby called an “internal working model”(1969).

During infancy, the expectations of other people and how they will behave becomes inscribed in the brain, outside conscious awareness. This underpins behavior and relationships throughout life. The human infant's emotional capacities are the least hard-wired in the animal kingdom, and thus most influenced by experience.

In the last 40 years, one of the overarching themes in descriptions of “good parenting” has been that of “sensitivity”. The responsiveness of the parent to **that** particular child, in **that** particular emotional state at **that** moment in time, is critical to that child's emotional development. Having said that, the “good-enough” mother/parent starts off with an almost complete adaption to the infant's needs, and as time passes she adapts less and less completely, according to the infant's growing ability to deal with her failure. Her failure to meet every need of the child helps him to adapt to external realities, and it is in the repair process that learning occurs (Winnicott, 1973).

During the first year of life an infant sees the parent's smiling face, or hears her wooing voice, which entices the infant to turn and look, listen and smile back. The parent acknowledges and affirms this response. In the psychological literature, this important relational experience is called “mirroring” (Winnicott, 1971) and it is how the infant begins to acquire a sense of self. Through many of these interactions, the infant begins to **recognize patterns**, as they share attention, take pleasure in

interactions, read each other's cues and respond to each other over and over through gaze, vocalisations and gestures. By the second year of life, these patterns lead to a sense of self as purposeful, and a differentiated sense of others. By the third year of life these affect-based interactions enable a child to form and give meaning to symbols leading to higher levels of thinking. Comprehensive perceptions in turn set the foundation for cognitive capacities.

It is important to translate what we know about emotional development into our work as Occupational Therapists.

As Occupational Therapists we have a unique opportunity to support parents of young children with developmental challenges due to our background in understanding the underlying neurobiology of the child's sensory processing, postural control, praxis and related motor planning capacities. These systems only function optimally when we consider the social-emotional context of the child's experience. Ayres' work (1973) was rich in considering the sensory systems and sensory integration with a focus on “The just right challenge” which highlights emotion and cognition in synchrony with the processing of sensory input.

***“IT IS IMPORTANT TO TRANSLATE WHAT WE KNOW ABOUT EMOTIONAL DEVELOPMENT INTO OUR WORK AS OCCUPATIONAL THERAPISTS.”***

Understanding emotional development, informs us how to tailor effective, affective interactions and to coach the parent or play partner to engage with the child in a manner that will support the child, and strengthen their emotional developmental capacities.

My endeavours to acquire an in-depth understanding of typical functional emotional development, was the critical element that transformed the way that I work with families of children with developmental disorders. My initial training



in Sensory Integration paved the way, but it became clear to me early on that this was , one piece of the puzzle, and that a deeper understanding of sensory-affective development was required.

I can highly recommend the one or two year “Infant observation” I completed through the IPCP1. New vistas opened up as I travelled this road with my colleagues trained in psycho-dynamic psycho-therapy. Incorporating an understanding of attachment theory and beyond, fundamentally changed my thinking as I came to an understanding that all sensory experiences are dual coded for affect, and that affective experiences are perceived as sensation. Therefore, neither experience occurs without the other. Interconnectivity of the visual, auditory and somatosensory aspects of a sensory experience in concert with affect, supports meaningful and comprehensive perceptions.

The neurobiological dual coding theory (DCT) (Paivio, 2013) explains human behavior and experience as a dynamic associative process that operates on a rich network of verbal and non-verbal representations. This is the key to understanding how emotions organize our perception of sensation and therefore our intellectual abilities e.g. in the first few days of life, infants react to sensations emotionally: they suck harder when they see their mother, and prefer their own mother’s touch and scent. They learn concepts like “hot and cold” from the temperature of their bath and bottle. They learn about quantity based on how much of anything they like, they got e.g. food.

While the Infant observation experience enriched my understanding of the changing maternal-infant relationship and its impact on development; I felt I needed more practical tools to apply this knowledge to my clinical work in functional development. Further exploration led me to the DIR® (The Developmental, Individual Difference, Relationship based model) (Greenspan & Wieder 1998) which has given me a practical way to integrate the many frames of reference that are core to our profession.

The model provides a roadmap for the treatment of developmental, learning and emotional challenges and diagnoses.

The widespread applicability is possible because it is based on a theory that focuses on capacities that are fundamental to the development of all children. DIR® is a comprehensive model with a range of interventions that can be tailored to specific underlying sensory processing, motor and learning challenges, as well as family and cultural factors.

Understanding individual differences in sensory processing, motor control and praxis is the invaluable contribution that Occupational Therapy has made to the DIR® model, Georgia deGangi (PhD. OTR), whom we all know well for her seminal work in developing assessment tools for evaluating infants and young children, was in collaboration with Dr. Stanley Greenspan at the time when the DIR® model was conceptualized.

Occupational Therapists can plot social-emotional development of the young child from 0 – 3yrs using the questionnaire that accompanies the Social-Emotional Growth Chart (Greenspan, 2004), which is now part of the Bayley Scales III (2006). This in conjunction with a play observation between the parent/caregiver and child as described in the Functional Emotional Assessment Scale (FEAS) (Greenspan, Wieder & de Gangi 2003) and the Sensory Profile 2 (Infants and Toddlers) (Dunn, 2014) allows for a comprehensive assessment of the effects of Sensory Processing Disorder on social-emotional development.

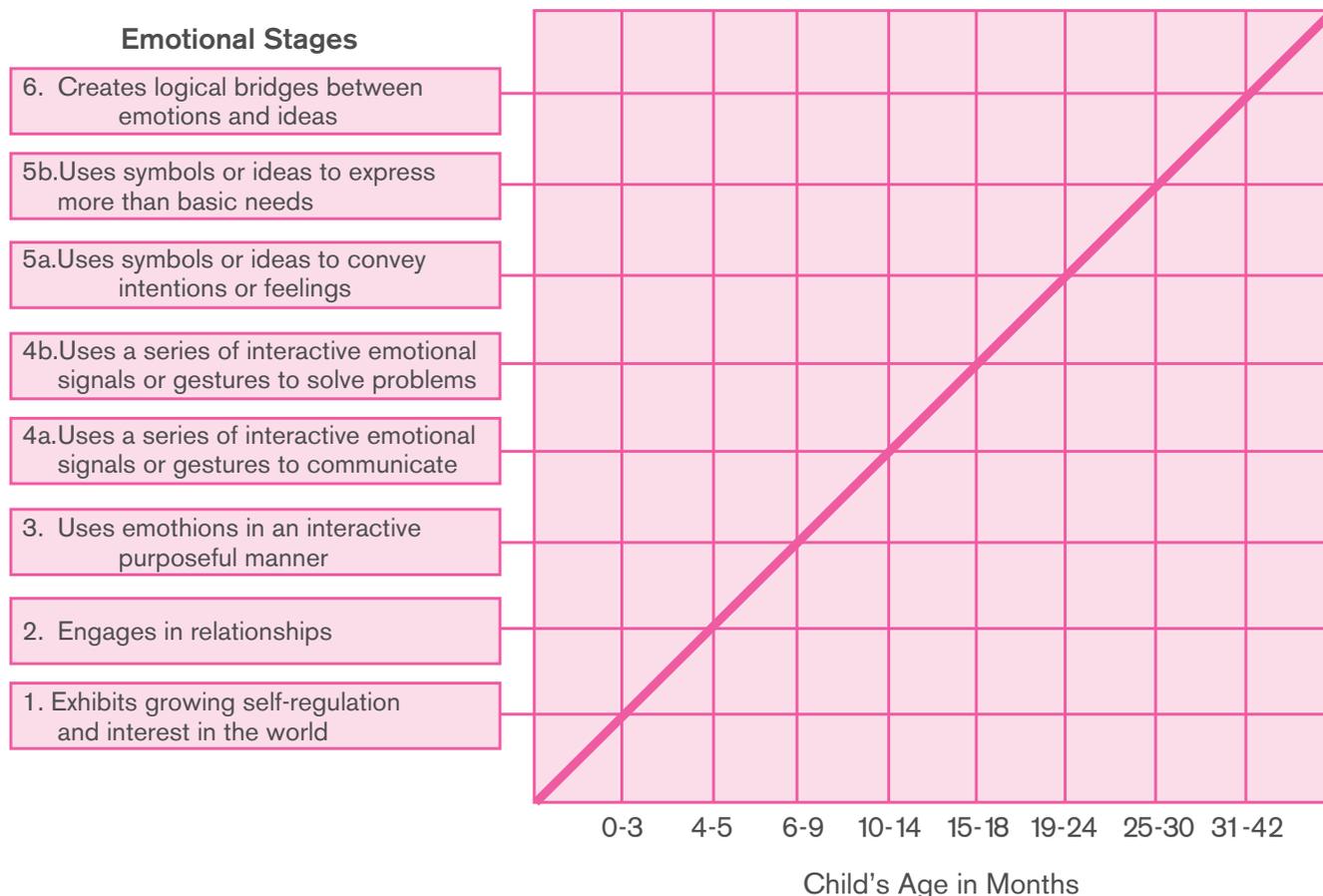


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1. IPCP: Institute for Psycho-dynamic Child Psychotherapy [www.ipcp.co.za](http://www.ipcp.co.za)



## SOCIAL-EMOTIONAL GROWTH CHART

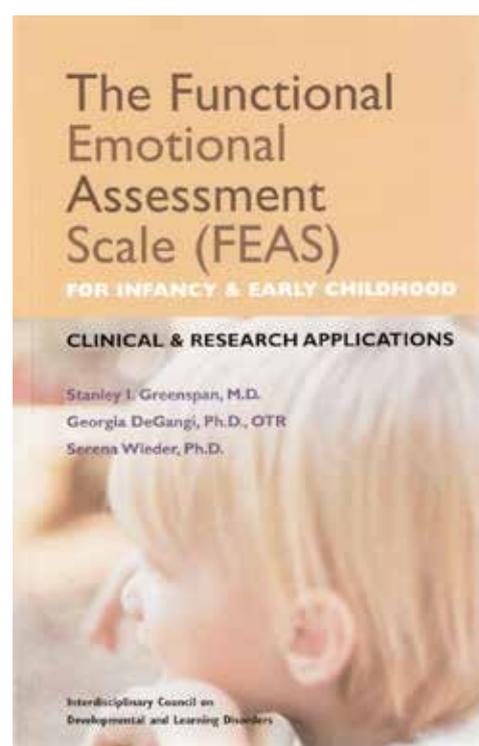


In his work Stanley Greenspan had questions about the progression of social-emotional development across the lifespan. In answering these questions, he developed the Social-emotional Growth Chart which underpins the DIR® model.

In reviewing Greenspan's questions, I offer a summary of the six foundational capacities for development in typically developing infants between birth and 4 years below.

"How does the child develop the miraculous ability to attend, to be calm and interested in the world? (Greenspan, 2000)"

It is through the process of co-regulation and shared attention that ultimately the capacity for self-regulation occurs.





## 1. EXHIBITS GROWING SELF-REGULATION AND INTEREST IN THE WORLD (0 – 100 YRS)

During the first three months of the infant's life, the infant's primary task is to attain physiological and emotional regulation i.e. to be calm and focused and take a mutual interest in the sights and sounds in the environment while he begins to share his interest with his caregiver. His parent finds the optimal level of stimulation to support him and maintains a calm alert state through proximity, rocking, smiling, eye gaze and tone of voice. He learns to tolerate increasing intensity of sensation while remaining regulated across a range of emotions and experiences through these sensitive interactions. This will bring about a shift from dependency on his primary caregiver, to maintain his calm, regulated state of arousal: a shift from co-regulation to self-regulation.

**Co-regulation** is the "social process by which individuals dynamically alter their actions with respect to the ongoing and anticipated actions of their partner (Fogel, 1993)"

When co-regulation occurs there is shared pleasure and both the child and the caregiver enjoy the interaction. Mirror neurons are activated when there is attunement and the capacity to comfort the other is experienced.

Parents who have had an infant who suffers from colic will know how hard it is to co-regulate and share attention when the infant's physiological and emotional state is extremely dysregulated. The critical role of parents in their endeavor, is to attain a state of co-regulation, through the range of emotions. This is vital for shared attention and ongoing emotional development.

**Shared attention** is knowing when to pay attention and when to withdraw it. This capacity provides the foundation for the rhythms of social communication (White, 2000). In the earliest weeks, the mother and infant are so closely and emotionally bound, that the infant cannot distinguish between his own internal states and his mother's influence

(Ratey, 2002). Mother and infant need to be in a positive feedback loop of sensory, motor and affective interaction to synchronize their emotional states, in order that the infant can begin to learn about emotional expression.

Over time the infant learns to read and attune to the parent's sensory and emotional signals. The parent approaches the infant saying "I'm coming to pick you up". The infant **responds** to what they hear and see, by smiling, a change of emotional tone and posture is apparent in preparation for being picked up by the parent.

During the 3rd month of life, as the typically developing infant is able to cope with increasing social and environmental demands, there is a developmental shift from a dependence on co-regulation with his parent to **self-regulation**. "Self-regulation, is the ability to achieve, monitor and change a state of attention and behaviour to match the demands of the environment or situation". Self-regulation enables the infant to separate from the primary caregiver, as they realize they can manage on their own. In order for the infant to learn to self-regulate through a range of emotions, parents need to present new experiences in a way that promotes shared attention. By focusing on the emotional texture of their voices, gestures and slowing things down to the infant's pace, parents support the maturational process from co-regulation to self-regulation. By allowing our young children to explore new horizons, to fall apart, recover and survive without their mother's co-regulating presence, we strengthen their capacity for self-regulation.

***"SELF-REGULATION ENABLES THE INFANT TO SEPARATE FROM THE PRIMARY CAREGIVER, AS THEY REALIZE THEY CAN MANAGE ON THEIR OWN."***

The "goodenough parent" (Winnicott 1973) scaffolds the repair process and is the critical factor that enables the child to take the steps on his own in climbing the emotional developmental ladder. Therefore, at times when there



is dys-regulation caused by frustration, hard as it may be, parents are encouraged not to jump in and rescue immediately, but to slow things down, support through co-regulation and enable the developing child to find ways of self-regulating. **This critical developmental milestone which strengthens over the lifespan**, provides the foundation for individual's future capacity to function independently in society.

However, in situations when the emotional demands become too great, where attempts to maintain emotional regulation and control within an interaction with another person are necessary; even adults tend to regress to their own familiar self-soothing strategies. These strategies may be sensory e.g. tensing our muscles, making direct eye gaze, tapping a foot or chewing on a pencil; or physiological e.g. breath-holding or taking deep breaths in an attempt to control our heart rate in order to sustain shared attention.

From three months on, the capacity for self-regulation will expand as the infant begins to demonstrate increasingly robust capacities for shared attention, with warm vocalisations and a change of posture. Periods of distress may be more efficiently resolved. As the infant experiences mirrored affective interaction with their parent, primary attachment becomes secure, the infant becomes more alert and available to engage. As evidence of this, we may note that alternating gaze is more sustained.

**“How does the child develop the desire to interact with others and to “woo” those around them to interact with him? (Greenspan, 2000)”**  
*It is through the process of attachment to the primary caregiver.*

## 2. ENGAGES IN RELATIONSHIPS (4 – 6 MONTHS)

The importance of a child's attachment relationships for their emotional well-being and future development was highlighted in the 1950's by John Bowlby and Mary Ainsworth who studied the effects of early separation on

the emotional development of children. Bowlby described the negative effects of enforced separation on babies who were hospitalized in that era. He also suggested a link between some children with disrupted family backgrounds - caused by wartime evacuation and juvenile delinquency.

**“IT IS THESE MENTAL REPRESENTATIONS THAT GUIDE FUTURE SOCIAL AND EMOTIONAL BEHAVIOR, AND PROVIDE THE CHILD WITH AN INTERNAL WORKING MODEL THAT GUIDES THEIR RESPONSIVENESS TO OTHERS IN GENERAL.”**

Bowlby theorized that based on the quality of the attachment relationship, the infant forms a representation of himself and others. If by 3 yrs of age this is not solidified, then there may be potentially dire consequences to the individual's understanding of the world and future interactions with others (Schore, 2000).

According to Bowlby (1969), the primary caregiver acts as a prototype for future relationships via an internal working model. This model serves three very important functions: firstly, the recognition that others are trustworthy; secondly, that the self is valuable; and thirdly, that the self is effective in interacting with others. It is these mental representations that guide future social and emotional behavior, and provide the child with an internal working model that guides their responsiveness to others in general.





In cases where there is secure attachment, the next four months are critical as the relationship between the infant and his parents deepens and they increasingly interact with warmth, trust and intimacy. It is also known as the “falling in love stage”.

Once the infant feels secure in the intimacy of the primary trusted relationship with his parent, there is a mutual attunement. The pair use their senses to enjoy each other through looks, gesture, pointing, facial expressions, body movement, sound, vocalizations in synchronous rhythm; the one anticipating the actions of the other with a sense of knowing. They share emotional states, with a build-up of anticipation and then a shared release of tension. The parent, in this way has the ability to comfort the infant in a greater and greater variety of ways using touch, emotional tone, and mirroring the infant’s emotional range and ultimately language. This deepens the process of attachment.

***“BABIES SHOW A CLEAR DISTINCTION BETWEEN THE PEOPLE WITH WHOM THEY FEEL SECURE, AND OTHER UNFAMILIAR ADULTS WHOM THEY TREAT MORE WARILY.”***

Over time, the infant will need to remain related and engaged across the full range of emotions, even when disappointed, scared, angry or feeling other stress. One of the earliest signs that a baby is developing a clear sense of attachment to their parent is distress at separation from them. It can even happen in the home, in the company of other people that the baby knows well.

When the baby’s attachment needs are challenged, he is not comforted, even by a familiar friend of the family. When his mother returns and he can be close to her, he is reassured and his attachment needs are met, he can once again relax and focus on the friend. Stranger-anxiety usually becomes apparent at around eight months of age.

Babies show a clear distinction between the people with whom they feel secure, and other unfamiliar adults whom they treat more warily. Intelligence is forming as the baby discriminates the difference between mother’s and father’s voice and touch.

The way parents mediate other relationships, will determine how readily the baby is able to engage with new people and other new experiences.

***“How does the child learn to read other’s gestures, and indicate their needs? Greenspan 2000)”***  
***Initially through emotions, then communicating their emotions through gesture and ultimately combining these with language?***

### 3. USES EMOTIONS IN AN INTERACTIVE PURPOSEFUL MANNER (6 – 9 MONTHS)

Between four and ten months, a purposeful, continuous flow of interactions with gestures and reciprocal emotions gets underway. The infant begins to act purposefully, now that he is more aware of his body and the functions it can perform. As the infant gains motor control over his body and intent, he is better able to communicate his desires. With emerging abilities to , sit and turn, crawl and creep, give and take, drop and throw objects, the infant’s awareness of the interpersonal world is growing, as is his awareness of his body in space and in relation to others who may also be moving.

The next critical social emotional milestone is that of joint attention. At this stage in development the baby becomes focused on others (9 – 24 mo). A capacity for joint attention entails the ability to convey and read non-verbal and later the verbal communicative intent of the other.

There is a sharing of emotional states, as parent and child realize that they understand each other. “You see what I see, and I see what you see”.



#### 4. USES A SERIES OF INTERACTIVE EMOTIONAL SIGNALS OR GESTURES TO COMMUNICATE AND SOLVE PROBLEMS (9 – 18 MONTHS)

Sometime between nine and eighteen months, the baby learns the back and forth rhythms of interactive emotional signaling. He begins to use this ability to think about and solve problems that are emotionally meaningful to get what he wants, e.g. pulling his mother's hand and taking her to the door to go outside to play. All the infant's senses work with his motor system as he interacts with others to solve problems. Difficulties arise when he becomes aware that things are not as they should be, based on his memory of prior experiences, and he now encounters new difficulties to solve, as his experience expands.

"Ninety-three percent of emotional meaning is conveyed non-verbally; thirty-eight percent in the tone of voice, fifty-five percent gestures; and only seven percent by the words we say" (Mehrabian, 1973).

At this stage, the baby begins to use complex purposeful gestures involving sequences and movement in space, that communicate intent and feelings. They are the bridge to language and ideas, and need to be varied, in a long continuous flow, and they need to demonstrate emerging problem solving abilities e.g. Peek-a-boo games where the baby removes the blanket, is a simple example of emerging emotionally based problem solving, which is the key to competence and meaning.

**"How does the child shift from using physical gestures to communicate his needs using language?"**

*He creates and functionally uses ideas as a basis for creative or imaginative thinking and giving meaning to symbols e.g. pretend play and the use of words to meet his needs (Foley, 2006).*

The child can now respond to the invitation to engage in an activity by following the gaze of someone else, initiating co-ordinated **joint attention** to elicit help in obtaining an object (9 – 24 months). The child typically initiates the activity and the parent sustains the interaction and shares the experience. Layers are added as the baby learns to follow the parent's gaze, acknowledging the other's focus of attention.

This is the stage of intentional, non-verbal communication between infant and parent which conveys intentions that start non-verbal "conversations", enticing the child to actively participate in the world beyond.

Later the infant learns increasingly to use eye gaze, pointing, and vocalisations to indicate a different focus of attention, to elicit aid in attaining an object or event (Mundy 2006).

**"How does the child develop the ability to think and plan how to interact with their world and solve physical problems to achieve their goals? (Greenspan, 2000)"**

*It is through the process of maintaining communication across space, integrating affective polarities and synthesizing an emerging pre-representational sense of self, separate from the other (Foley, 2006).*





## 5. USING SYMBOLS OR IDEAS TO CONVEY MEANING, INTENTIONS OR FEELINGS AND TO EXPRESS MORE COMPLEX NEEDS (19 – 36 MONTHS)

The ways in which parents respond to the child's emotional expressions will determine the child's capacity to organize their emotions into conscious feelings. All feelings and ideas can be expressed through words and play instead of acting out behavior. Between eighteen and thirty-six months, the toddler begins to use symbolic play to represent or symbolize his intentions, feelings and ideas in play and or language, using gestures, words and symbols.

Symbolic play provides a distance from real life and immediacy of needs, to differentiating the self from others, through different roles, and because play is not bound by time and space, to differentiating the self from the environment. Symbolic play turns images into concepts, that reflect the meaning of the image, and allow the child to become abstract. Longer chains of co-regulated interactions that enable the child to recognize variations in the parent's gestures, facial expressions and tone of voice deepen the emotional texture of the play. These recognitions enable him to become aware of his parent's emotional state. This is the model for developing empathy for others and becomes the vehicle for emotional transformations, in which the toddler learns to label his feelings and thereby give meaning to them. Later, in parallel play with his peers, the child learns to imitate others, to share emotional states, and to generate his own ideas.

The beginnings of symbolic play are based on real life experiences, acted out in pretend dramas as the child experiments with different roles and feelings.

The earliest symbols of the mother are frequently blankets and soft toys, which are associated to feelings of comfort and reassurance, and can represent affects and experiences of dependency, attachment, joy, love or separation.

Play increases in complexity as the child's world and environment expands. e.g going to the doctor, a policeman, fireman or nurse. Playing with animals, or cars illustrates how life experiences become embedded in play. At this stage play is still concrete and reality based. This shift where the child is able to associate experiences from the past, play them out in the present, and use toys and words as symbols, forms the foundation essential for the development of language, and understanding of past, present and future.

**“How does the child develop the ability to become a social being, to think, to communicate as well as have compassion for others? (Greenspan, 2000)”**

***He builds bridges between ideas as a basis for logic, reality testing, thinking and judgement (Foley, 2006)***

## 6. CREATES LOGICAL BRIDGES BETWEEN EMOTIONS AND IDEAS (31 – 42 MONTHS)

As he develops more logic and understanding of himself and others, at around 3 yrs of age, the child begins to combine ideas to tell a story, and to understand what is real and what is not. Stories may have imaginary characters; animal figures who talk and magical elements. These may become part of his fantasy world, as he discovers he needs more power to encounter the fears and conflicts of life. Reasoning skills kick in to elaborate on sequences and stories become more logical and realistic.

As the child's mental and emotional abilities move towards abstract thinking he develops the ability to distinguish reality from fantasy, self from non-self, one feeling from another, and make distinctions concerning time and space.

If this stage is not consolidated the child will be unable to play co-operatively with his peers and always needs to be in control of the game.

Beyond Level 6, this expands further to abstract levels of



multi-causal and comparative thinking, and he ultimately learns to look at and reflect on his performance and feelings. He can question why he is feeling a certain way and contrast this with how he usually feels, or can compare his current efforts with earlier experiences. This kind of thinking allows him to make inferences about himself and others, and creates new choices and ideas. Symbolic play can be used to explore these ideas.

## Application of the theory of Infant Emotional Development

DIR<sup>®</sup> is useful theory that identifies the six fundamental capacities that emerge in infancy and expand in duration, range and stability as the child grows and reach across the lifespan. Floortime<sup>™</sup> is the specific technique that translates this theory into practice. In play, caregivers consider the child's unique motor and sensory-processing profile and tailor their interactions to strengthen the connection between sensation, affect, and motor action. They create states of heightened pleasure in playful interactions to engage and stay connected by reading the child's intentions and following his natural interests.

The child's evolving DIR<sup>®</sup> profile determines the individualized intervention as he progresses. At the same time, the child can be challenged towards greater mastery of social, emotional and intellectual capacities.

The true value of the DIR<sup>®</sup> model lies in its ability to empower parents with the tools to truly understand the child's sensory profile; how it is dual coded with social-emotional development, and how it impacts on their functional performance across all occupational domains.

As their child ascends the emotional developmental ladder, parents learn to attune to their developing child's non-verbal signals and scaffold the process of co-regulation to self-regulation through a range of emotional states. These are the critical factors that will determine the development of a robust sense of self and emotional resilience in adolescence and adulthood thereby supporting consistent realization of their true potential regardless of all emotional states and environments.

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- The Faculty at Profectum Foundation who have created opportunities for professionals and parents in other countries to gain world-class training in DIR<sup>®</sup> : Floortime<sup>™</sup> online, from experts across all disciplines [www.profectumfoundation.org](http://www.profectumfoundation.org)





## VISION

To provide an internationally accepted standard of training and education in Ayres Sensory Integration (ASI) in order to deliver a service of excellence to the ultimate benefit of all clients within the South African context.

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## MISSION

- To ensure relevant training in ASI for occupational therapists
- To ensure continued professional development within the field of ASI
- To align our training, assessment and treatment protocols with international standards
- To play a leading role in the application of ASI in South Africa
- To ensure best evidence based practice in ASI
- To raise awareness of ASI amongst relevant stakeholders
- To network with key stake holders
- To support and educate all role players involved in the care and development of the client
- To encourage research in the field of ASI in SA and abroad
- To ensure equal accessibility to ASI assessment and treatment for all South Africans
- To enhance and enable all individuals challenged with sensory integration difficulties or dysfunctions to live occupationally fulfilled lives



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