



Understanding Growth and Development Patterns of Infants

Novella Ruffin, Family and Human Development Specialist, Virginia State University

Introduction

The first five years of life are a time of incredible growth and learning. An understanding of the rapid changes in a child's developmental status prepares parents and caregivers to give active and purposeful attention to the preschool years and to guide and promote early learning that will serve as the foundation for later learning. Understanding child development is an important part of teaching young children.

Developmental change is a basic fact of human existence and each person is developmentally unique. Although there are universally accepted assumptions or principles of human development, no two children are alike. Children differ in physical, cognitive, social, and emotional growth patterns. They also differ in the ways they interact with and respond to their environment as well as play, affection, and other factors. Some children may appear to be happy and energetic all the time while other children may not seem as pleasant in personality. Some children are active while others are typically quiet. You may even find that some children are easier to manage and like than others. Having an understanding of the sequence of development prepares us to help and give attention to all of these children.

Child Development

Development refers to change or growth that occurs in a child during the life span from birth to adolescence. This change occurs in an orderly sequence, involving

physical, cognitive, and emotional development.

These three main areas of child development involve developmental changes which take place in a predictable pattern (age related), orderly, but with differences in the rate or timing of the changes from one person to another.

Physical Development

Physical development refers to physical changes in the body and involves changes in bone thickness, size, weight, **gross motor, fine motor, vision, hearing, and perceptual development.** Growth is rapid during the first two years of life. The child's size, shape, senses, and organs undergo change. As each physical change occurs, the child gains new abilities. During the first year, physical development mainly involves the infant coordinating motor skills. The infant repeats motor actions which serve to build physical strength and motor coordination.



Reflexes

Infants at birth have reflexes as their sole physical ability. A **reflex** is an automatic body response to a stimulus that is involuntary; that is, the person has no control over this response. Blinking is a reflex which continues throughout life. There are other reflexes which occur in infancy and also disappear a few weeks or months after birth. The presence of reflexes at birth is an indication of normal brain and nerve development. When normal reflexes are not present or if the reflexes continue past the time they should disappear, brain or nerve damage is suspected.

Some reflexes, such as the **rooting and sucking reflex**, are needed for survival. The rooting reflex causes infants to turn their head toward anything that brushes their faces. This survival reflex helps them to find food such as a nipple. When an object is near a healthy infant's lips, the infant will begin sucking immediately. This reflex also helps the child get food. This reflex usually disappears by three weeks of age.

The **Moro reflex** or "startle response" occurs when a newborn is startled by a noise or sudden movement. When startled, the infant reacts by flinging the arms and legs outward and extending the head. The infant then cries loudly, drawing the arms together. This reflex peaks during the first month and usually disappears after two months.

The **Palmar grasp reflex** is observed when the infant's palm is touched and when a rattle or another object is placed across the palm. The infant's hands will grip tightly. This reflex disappears the first three or four months after birth.

The **Babinski reflex** is present in normal babies of full term birth. When the sole of the infant's foot is stroked on the outside from the heel to the toe, the infant's toes fan out and curl and the foot twists in. This reflex usually lasts for the first year after birth.

The **Stepping or walking reflex** can also be observed in normal full term babies. When the infant is held so that the feet are flat on a surface, the infant will lift one foot after another in a stepping motion. This reflex usually disappears two months after birth and reappears toward the end of the first year as learned voluntary behavior.

Motor Sequence

Physical development is orderly and occurs in predictable sequence. For example, the **motor sequence** (order of new movements) for infants involves the following orderly sequence:

- Head and trunk control (infant lifts head, watches a moving object by moving the head from side to side

- occurs in the first few months after birth.

- Infant rolls over turning from the stomach to the back first, then from back to stomach - four or five months of age.
- Sit upright in a high chair (requires development of strength in the back and neck muscles)-four to six months of age.
- Infant gradually is able to pull self into sitting positions.
- Crawling - occurs soon after the child learns to roll onto the stomach by pulling with the arms and wiggling the stomach. Some infants push with the legs.
- Hitching - infant must be able to sit without support; from the sitting position, they move their arms and legs, sliding the buttocks across the floor.
- Creeping - As the arms and legs gain more strength, the infant supports his weight on hands and knees.
- Stand with help - as arms and legs become stronger.
- Stand while holding on to furniture.
- Walk with help with better leg strength and coordination.
- Pull self up in a standing position.
- Stand alone without any support.
- Walk alone without any support or help.



Changes in physical skills such as those listed above in the motor sequence, including hopping, running, and writing, fall into two main areas of development. **Gross motor** (large muscle) **development** refers to improvement of skills and control of the large muscles of the legs, arms, back and shoulders which are used in walking, sitting, running, jumping, climbing, and riding a bike. **Fine motor** (small muscle) **development** refers to use of the small muscles of the fingers and hands for activities such as grasping objects, holding, cutting, drawing, buttoning, or writing.

Early hand movements in infants are reflex movements. By three to four months, infants are still unable to grasp objects because they close their hands reflexively too early or too late, having no control over these movements. They will swipe at objects. By the age of nine months, infants improve eye-hand coordination which gives them the ability to pick up objects.

Children must have manual or fine motor (hand) control to hold a pencil or crayon in order for them to

write, draw, or color. Infants have the fine motor ability to scribble with a crayon by about 16 to 18 months of age when they have a holding grip (all fingers together like a cup). By the end of the second year, infants can make simple vertical and horizontal figures. By two years of age, the child shows a preference for one hand; however, hand dominance can occur much later at around four years of age. By the age of four, children have developed considerable mastery of a variety of grips, so that they can wrap their fingers around the pencil. Bimanual control is also involved in fine motor development, which enables a child to use both hands to perform a task, such as holding a paper and cutting with scissors, and catching a large ball.

Vision

At birth, an infant's **vision** is blurry. The infant appears to focus in a center visual field during the first few weeks after birth. In infants, near vision is better developed than their far vision. They focus on objects held 8 to 15 inches in front of them. As their vision develops, infants show preference for certain objects and will gaze longer at patterned objects (disks) of checks and stripes than disks of one solid color. Studies also show that infants prefer bold colors to soft pastel colors. They also show visual preference for faces more than objects. By two months of age, an infant will show preference (gaze longer) at a smiling face than at a face without expression.

As infants grow older they are more interested in certain parts of the face. At one month of age, their gaze is on the hairline of a parent or other caregiver. By two months of age, infants show more interest in the eyes of a face. At three months of age, the infant seems very interested in the facial expression of adults. These changes in the infant's interest in facial parts indicate that children give thought to certain areas of the face that interest them.

Hearing

Hearing also develops early in life, and even before birth. Infants, from birth, will turn their heads toward a source or direction of sound and are startled by loud noises. The startle reaction is usually crying. Newborns also are soothed to sleep by rhythmic sounds such as a lullaby or heartbeat. Infants will look around to locate or explore sources of sounds, such as a doorbell. They also show reaction to a human voice while ignoring other competing sounds. A newborn can distinguish between the mother's and father's voices and the voice of a stranger by three weeks old.

At three to six months, vocalizations begin to increase. Infants will increase their vocalizations when persons hold or play with them.

Perception

To explore their world, young children use their senses (touch, taste, smell, sight, and hearing) in an attempt to learn about the world. They also think with their senses and movement. They form **perceptions** from their sensory activities. **Sensory-Perceptual development** is the information that is collected through the senses, the ideas that are formed about an object or relationship as a result of what the child learns through the senses. When experiences are repeated, they form a set of perceptions. This leads the child to form **concepts (concept formation)**. For example, a child will see a black dog with four legs and a tail and later see a black cat with four legs and a tail and call it a dog. The child will continue to identify the cat as a dog until the child is given additional information and feedback to help him learn the difference between a dog and a cat. Concepts help children to group their experiences and make sense out of the world. Giving young children a variety of experiences helps them form more concepts.

Cognitive Development

Cognitive development refers to the ways children reason (think), develop language, solve problems, and gain knowledge. Identifying colors, completing a maze, knowing the difference between one and many, and knowing how things are similar are all examples of cognitive tasks. Children learn through their senses and through their interactions with people and things in the world. They interact with the world through the senses (see, touch, hear, smell, taste), and construct meaning and understanding of the world. As children gain understanding and meaning of the world, their cognitive development can be observed in the ways they play, use language, interact with others, and construct objects and materials. As children grow and interact with their world, they go through various stages of development. Although the stages are not precisely tied to a particular age, there are characteristics that describe children at different ages.

Sensorimotor Stage

The sensorimotor stage occurs in infancy from birth to about 12 months. Here, infants learn about the world through their senses, looking around constantly, looking at faces of caregivers, responding to smiling faces. Their eyes focus on bright colors and they respond to sounds by looking toward the sound. During this time

of sensory learning, infants also show interest in light and movement, such as a mobile above the crib. Infants also begin to recognize their own name in this stage.

Infants also learn through communication. Their initial communication is through crying which is a general cry to bring attention to their needs. Later the cry changes and becomes different and more specific to identify what the baby needs or wants. The cry develops into gestures, and the beginning stages of language such as babbling, then monosyllables such as “ba” and “da” and later to single words put together to make a meaningful sentence. You can observe that infants also communicate through their motor actions. As they grow, they kick and use their arms to reach for people and things that are interesting to them. They respond to voices and seek to be picked up by reaching out. Infants make a very important learning discovery - that through their actions of reaching, making sounds, or crying, they cause others to respond in certain ways. It is very important that parents and other caregivers nurture and respond to the infant’s actions, to hold, carry the infant, sing to the infant, play with the infant, and meet his needs in other responsive and nurturing ways.

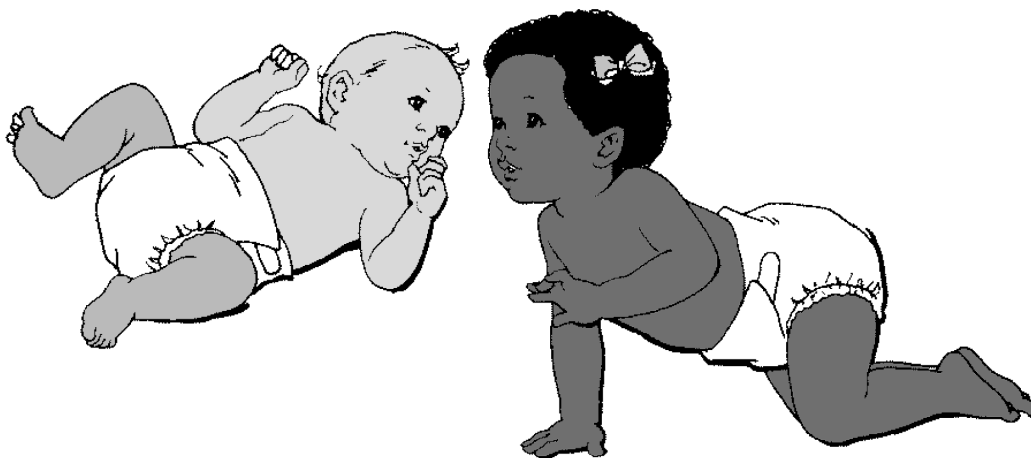
As infants continue to interact with their surroundings and make meaning out of their world, they also learn about themselves, their own bodies. Their hands and toes become body objects of interest. They suck on their hands and toes and may seem to be fascinated with their own hands. During this stage of sensory learning, infants reach for, hit at, and grasp objects that are within their reach, such as dangling jewelry and long hair. They also enjoy toys that rattle and squeak and will put any and all things in the mouth. These are all sensory ways that the infant learns; however, we must make sure that the objects are clean and safe for the baby to explore.

As infants master new developments in the motor sequence (creeping and crawling), they learn that they have more control over their world. They are no longer totally dependent on an adult to meet some of their needs. For example, if an infant sees a toy on the floor, or his bottle on a table within reach, he has the motor capacity to move toward it and reach for it. The infant’s increased freedom to move and have toys and objects within reach is very important. The task for adults, parents and other caregivers is to ensure that babies have a safe and clean environment in which they can move about and interact.

Understanding the characteristics of cognitive development gives us knowledge and insights into how children are developing, thinking, and learning. Principles of cognitive development provide us with a basis for understanding how to encourage exploration, thinking, and learning. As parents and caregivers, we can support cognitive development in infants and young children by providing a variety of appropriate and stimulating materials and activities that encourage curiosity, exploration, and opportunities for problem solving.

Object Permanence

Between the age of six to nine months the concept of **object permanence** develops. This is the infant’s understanding that an object continues to exist even if it is out of the infant’s sight. Prior to this time, the infant’s understanding is “out of sight, out of mind.” Objects cease to exist when the infant does not see them. For example, when an infant plays with a rattle or other toy and a blanket is placed over the rattle, the infant does not search for it because it does not exist in the mind of the infant. When object permanence is developed, the child begins to understand that the rattle is still there even though it is covered, out of sight.



The infant's understanding of object permanence means that infants are developing memory and goal oriented thinking. Searching under a blanket for a rattle means that the child remembers that the rattle was there. It also means that the infant has a goal of finding the rattle and takes action to find it. Infants during this time will give up searching within a few seconds if they do not find the object.

Also important to object permanence is the understanding that other people exist all the time. Children begin to understand that they can cry not just to get needs met but as a means of calling parents or other caregivers. They know that even if a person is not within their reach or their sight, the person still exists. The cry will call the person to them. Also, crying to call a person is a sign that infants are learning to communicate.

Emotional Development/ Social-Emotional Development

The expression of feelings about self, others, and things describe **emotional development**. Learning to relate to others is **social development**. Emotional and social development are often described and grouped together because they are closely interrelated growth patterns. Feelings of trust, fear, confidence, pride, friendship, and humor are all part of social-emotional development. Other emotional traits are self concept and self esteem. Learning to trust and show affection to others is a part of **social-emotional development**. The child's relationship to a trusting and caring adult is a foundation of emotional development and personality development. Furthermore, when a child has been neglected, rejected, and does not feel secure, he has difficulty developing skills to socialize with others.

Temperament

Children, from birth, differ in the ways they react to their environment. **Temperament** refers to the quality and degree or intensity of emotional reactions. **Passivity, irritability, and activity** are three factors that affect a child's temperament. **Passivity** refers to how actively involved a child is with his or her environment or surroundings. A passive infant withdraws from or is otherwise not engaged with a new person or event. An active infant does something in response to a new person or event. There is also difference in the level of **irritability** (tendency to feel distressed) of infants. Some infants may cry easily and be difficult to comfort and soothe even if you hold them. Other infants may rarely cry and are not bothered as much by change. Caring for these infants is usually viewed as easier for adults. **Activity** levels or levels of movement also vary in infants. Some

infants make few movements, are quiet, and when asleep, may hardly move. Other infants constantly move their limbs (arms and legs) and may be restless in sleep.

As caregivers, we need to nurture and give loving attention to all infants regardless of their temperament. We also need to adjust to the temperament of different children. Even very irritable infants can grow to be emotionally happy and well adjusted if caregivers are patient, responsive, and loving in their caregiving ways.

At birth, infants do not show a wide range of emotions. They use movements, facial expressions, and sounds to communicate basic comfort or discomfort. They coo to show comfort and cry to show that they are uncomfortable. In the first few months, infants display a range of emotions as seen through their facial expressions. Happiness is shown when the corners of the mouth are pulled back and the cheeks are raised. The infant will begin to show fear, anger, and anxiety between six and nine months of age. Signs of fear are the open mouth with the corners of the mouth pulled back, wide eyes, and raised eyebrows. By the end of the second year, children have developed many ways to express their emotions.

Attachment

Socially, young children and particularly infants tend to focus on the adults who are close to them and become bonded to a small group of people early in life - mainly the people who care for them. This forms the basis for **attachment** which is the strong emotional tie felt between the infant and significant other. The quality of attachments depends upon the adults. When attachments are formed, young infants learn that they can depend on mothers, fathers, caregivers, or older siblings to make them feel better.

Attachment begins early in life and infants show several early attachment behaviors. Behaviors such as cooing, kicking, gurgling, smiling and laughing show that infants care for and respond early to people who are important to them. Crying and clinging are also attachment behaviors of infants which are used to signal others. Infants as early as one month old show signs of attachment in the form of anxiety if they are cared for by an unfamiliar person. They may show distress signs such as irregular sleeping or eating patterns.

Separation Anxiety

Separation anxiety is another attachment behavior of infants. This is when a child shows distress by often crying when unhappy because a familiar caregiver

(parent or other caregiver) is leaving. The first signs of separation anxiety appear at about six months of age and are more clearly seen by nine months of age. Separation anxiety is very strong by 15 months of age and begins to gradually weaken around this time also. Parents and other caregivers need to understand and prepare for this attachment behavior (separation anxiety) in children by making transitions easier for the child. Children between the age of 9 and 18 months will usually have a lot of difficulty beginning a child care program. Parents can make the transition easier by bringing the child's favorite toy or blanket along. It is also important to understand separation anxiety as a normal developmental process in which children are fearful because their familiar caregivers are leaving them. Children beginning a child care program are in an unfamiliar surrounding with unfamiliar people. Children will gradually show less distress as the setting, the people, and routines become more familiar to them.

Conclusion

An understanding of infant growth and development patterns and concepts is necessary for parents and caregivers to create a nurturing and caring environment which will stimulate young children's learning. The growth and development of infants are periods of rapid change in the child's size, senses, and organs. Each change brings about new abilities. An infant's development in motor coordination, forming concepts, learning and using language, having positive feelings about self and others prepares them to build upon new abilities that will be needed for each change in a new stage of development. Caregivers can provide activities and opportunities for infants that encourage exploration and curiosity to enhance children's overall development.

Related Reading:

Bergen, Doris. 1988. "Stages of Play Development," Play as a Medium for Learning and Development. Doris Bergen, ed., Portsmouth, NH: Heinemann.

Bowlby, John. 1969. Attachment. Attachment and Loss. Vol. I. New York: Basic Books.

Forman, George, and David Kuschner. 1983. The Child's Construction of Knowledge. Washington, DC: NAEYC.

Greenspan, S. 1997. Growth of the Mind. New York: Addison Wesley.

Lerner, Clair. 2000. The Magic of Everyday Moments. Zero To Three, Washington, DC.

Shore, R. 1997. Rethinking the Brain: New Insights into Early Development. New York: Families and Work Institute.

Sprain, Joan. 1990. Developmentally Appropriate Care: What Does It Mean? National Network for Child Care - NNCC.