Chapter 4

INFANCY: THE FIRST YEAR OF LIFE
Learning Objectives

LO 4.1  Explain the gains in height and weight, the two basic principles of physical growth, and the growth of teeth in this period
LO 4.2  Identify the different parts of the brain and describe how the brain changes in the first few years of life
LO 4.3  Describe how infant sleep changes in the course of the first year and evaluate the risk factors for SIDS, including the research evidence regarding cosleeping
LO 4.4  Describe how infants’ nutritional needs change during the first year of life and identify the reasons and consequences for malnutrition in infancy
LO 4.5  List the major causes and preventive methods of infant mortality and describe some cultural approaches to protecting infants
LO 4.6  Describe the major changes during infancy in gross and fine motor development
LO 4.7  Describe when and how infants develop depth perception and intermodal perception
LO 4.8  Describe the first four sensorimotor substages
LO 4.9  Explain how object permanence develops over the course of the first year
LO 4.10 Summarize the major critiques of Piaget’s sensorimotor theory
LO 4.11 Explain how attention and habituation change during infancy
LO 4.12 Explain how short-term and long-term memory expand during infancy
LO 4.13 Describe the major scales used in measuring infant development and explain how habituation assessments are used to predict later intelligence
LO 4.14 Evaluate the claim that educational media enhance infants’ cognitive development
LO 4.15 Describe the course of language development over the first year of life
LO 4.16 Describe how cultures vary in their stimulation of language development
LO 4.17 Define infant temperament and describe three ways of conceptualizing it
LO 4.18 Explain how the idea of goodness-of-fit pertains to temperament on both a family level and a cultural level
Learning Objectives

• **LO 4.19** Identify the primary emotions and describe how they develop during infancy
• **LO 4.20** Describe infants’ emotional perceptions and how their emotions become increasingly social over the first year
• **LO 4.21** List the main features of infants’ social worlds across cultures
• **LO 4.22** Compare and contrast the two major theories of infants’ social development
Infancy: Growth and Change

Height and Weight

- Infants grow at a faster rate first year than at any other time.
- Weight doubles in first 5 months and triples by end of first year.
- Babies appear plump:
  - Will lose baby fat in first year.
  - Height is more uneven in growth than weight.

LO 4.1 Gains in Height and Weight
Infancy: Growth and Change Developmental Pattern

- Two key growth patterns
  - Cephalocaudal principle
  - Proximodistal principle

Figure 4.1  The Cephalocaudal Principle
Growth begins with the head and then continues downward to the rest of the body.
Infancy: Growth and Change
Teeth and Teething

• First tooth appears between 5-9 months
• Teething-first teeth break through skin
  ▪ Symptoms include:
    – Saliva production
    – Coughing
    – Rash
    – Grabbing things to put in mouth
• Relief can be found in teething ring or cold wet washcloth

LO 4.1 Gains in Height and Weight
Infancy: Growth and Change

Brain Development

• At birth, brain is \( \frac{1}{4} \) the size of adult’s brain
• By age 2 it will be 70% of adult size
• Growth in brain due to
  ▪ Exuberance-dendritic connections multiply
  ▪ Myelination-axons become encased in a myelin sheath
• Synaptic pruning increases efficiency

LO 4.2 Brain Structures and Changes
Infancy: Growth and Change
Brain Development

• Brain divided into three major regions
  ▪ Hindbrain
  ▪ Midbrain
    – Both structures mature early and perform basic biological functions
  ▪ Forebrain
    – Limbic system-hypothalamus, thalamus, hippocampus
    – Cerebral Cortex-lobes
Infancy: Growth and Development

Brain Specialization

Figure 4.2   Lobes of the Brain  What are the distinct functions of each lobe?
Infancy: Growth and Change

Infant Brain Plasticity

- Plasticity important for the infant’s brain development
- Adaptable to overcome damage
- Environmental deprivation can have permanent effects
- Example seen in Romanian Adoptions

LO 4.2 Brain Structures and Changes
Figure 4.3  Romanian Adoptees’ Cognitive Abilities, by Age of Adoption  The later the age of adoption, the lower their cognitive abilities. Source: Based on Beckett et al. (2006)
Infancy: Growth and Change
Sleep Changes

- Neonates sleep 16-17 hours
- 3-4 Months sleep 6-7 hours at night
- 6 Months cultural patterns influence sleep patterns
  - American 14 hours
  - Kipsigis 12 hours
  - Dutch 16 hours

LO 4.3 Infant Sleep Changes
Infancy: Growth and Development

Sleep Changes

• Early infancy is highest risk period for Sudden Infant Death Syndrome (SIDS)
  ▪ Leading cause of death for infants 1-12 months in developed countries
  ▪ Ethnic variations
    – Asians are less at risk; higher rates for African Americans and Native Americans
  ▪ Poorer prenatal care could be a factor

LO 4.3 Infant Sleep Changes
Sudden Infant Death Syndrome

- Risk factors:
  - Sleeping on stomach instead of back
  - Low birth weight and APGAR score
  - Smoking
  - Soft bedding

- Why aren’t these referred to as causes?
Infancy: Growth and Development

Sudden Infant Death Syndrome

• Campaign to reduce SIDS includes a Back to sleep campaign
• Campaign has caused reduction of SIDS worldwide

LO 4.3 Infant Sleep Changes
Figure 4.4  The Impact of Reduction Campaigns on Sids Rates  Why did rates of SIDS decline so much over this period?
Infancy: Growth and Change

Co-Sleeping

- Authorities in US warn against co-sleeping
  - Why might this be?
- Developing countries view it as normal
  - Believed to protect infants and to make breast feeding easier.
- How does this difference reflect different cultural beliefs?

LO 4.3 Infant Sleep Changes
Physical Development
Infant Health: Nutritional Needs

• Infants need a high fat diet which breast milk provides
• About 6 months may introduce solid foods
  ▪ Cultural variations in food introduced
  ▪ West-rice cereal
  ▪ Traditional cultures-mashed, pre-chewed, pureed

LO 4.4 Changes in Infants’ Nutritional Needs
Physical Development

Infant Health: Nutritional Needs

- Malnutrition during this time can be severe and enduring
- Can be caused by inability of mother to breastfeed
- Can cause marasmus- wasting away of body tissue due to lack of nutrients.

LO 4.4 Changes in Infants’ Nutritional Needs
Physical Development

Infant Health: Infant Mortality

• Most infant mortality is neonatal mortality
• Top sources of infant mortality include
  ▪ Malnutrition
  ▪ Malaria
  ▪ Diarrhea
• Vaccinations have been beneficial

LO 4.5 Causes and Prevention of Infant Mortality
Map 4.1  Infant Mortality Rates Worldwide  How do infant mortality rates compare with neonatal mortality rates (as shown in Map 3.2)? What are some potential causes of the high infant mortality rates in developing countries?
Cultural Beliefs and Practices to Protect Infants

Traditional cultures:
• Awareness of infant’s vulnerabilities influenced parenting practices
• Developed practices to help infants avoid harm
• Magical practices employed when medical remedies are not trusted or available

LO 4.5 Causes and Prevention of Infant Mortality
Physical Development
Motor and Sensory Development

• Gross motor development includes whole body movements like crawling
• Children tend to develop gross motor skills in sequence
• Sequence has genetic beginnings with environmental influences

LO 4.6 Gross and Fine Motor Development
## Table 4.1 Milestones of Gross Motor Development in Infancy

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Average age</th>
<th>Age range*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holding head up unsupported</td>
<td>6 weeks</td>
<td>3 weeks–4 months</td>
</tr>
<tr>
<td>Rolling over</td>
<td>4½ months</td>
<td>2–7 months</td>
</tr>
<tr>
<td>Sitting without support</td>
<td>7 months</td>
<td>5–9 months</td>
</tr>
<tr>
<td>Crawling</td>
<td>7 months</td>
<td>5–11 months</td>
</tr>
<tr>
<td>Standing</td>
<td>11 months</td>
<td>5–12 months</td>
</tr>
<tr>
<td>Walking with support (cruising)</td>
<td>11½ months</td>
<td>7–12 months</td>
</tr>
<tr>
<td>Walking</td>
<td>12 months</td>
<td>9–17 months</td>
</tr>
</tbody>
</table>

*Age ranges provided are for 90% of American infants. Based on: Bayley (2005).
Physical Development
Motor and Sensory Development

• Cultural practices emphasize the role of environment on gross motor skills
• Swaddling is common practice which can be restrictive to infants
• Other cultures encourage gross motor skills
• Long-term effects tend to minimally impact gross motor development

LO 4.6 Gross and Fine Motor Development
Figure 4.4  The Impact of Reduction Campaigns on Sids Rates

Why did rates of SIDS decline so much over this period?
Physical Development
Motor and Sensory Development

• Fine motor skills are the more precise motor abilities
• Major accomplishments include reaching and grasping
• By 9-12 mos., learn pincer grasp that allows feeding of themselves

LO 4.6 Gross and Fine Motor Development
Physical Development
Motor and Sensory Development

• Depth perception is influenced by development of binocular vision at 2-3 months of age
  ▪ Important when children become mobile

• Intermodal perception
  ▪ One-month-olds match things in mouth to things they touch
  ▪ By eight months can match unfamiliar faces with correct voice and gender

LO 4.7 Depth Perception and Intermodal Perception
Figure 4.5  Holding of Gusii Infants by Age  How does the percentage during the first year compare to infants in your culture?
Cognitive Development
Piaget’s Theory of Cognitive Development

• Sensorimotor Substages:
  ▪ (0-1 month) Simple reflexes
  ▪ (1-4 months) First habits & primary circular reactions
  ▪ (4-8 months) Secondary circular reactions
  ▪ (8-12 months) Coordination of secondary schemes

LO 4.8 Sensorimotor Substages
Object Permanence

LO 4.9 Object Permanence

• Object permanence - objects continue to exist even when not aware of them
  ▪ Under 4 months no understanding
  ▪ 4-8 months - uncertainty about existence of object when dropped (babies look only briefly)
  ▪ 8-12 months - Developing awareness
    - Will still make A not B error
Evaluating Piaget’s Sensorimotor Theory

• Criticisms:
  - Underestimating infants’ ability, especially regarding object permanence
  - Baillargeon and colleagues tested infant abilities using the violation of expectations method
  - Object permanence may reflect memory development
  - Cultural limitations as well

LO 4.10 Critiques of Piaget’s Theory
Information Processing in Infancy

LO 4.11 Attention and Habituation Changes

• Information processing model views cognitive changes as continuous.
• Historically, computer analogy was used, but awareness that brain is more complex has led to other models.
• Human thinking divided into capacities for attention, processing and memory.
Information Processing in Infancy

LO 4.11 Attention and Habituation Changes

Figure 4.7 Information Processing Model

The components of the model operate simultaneously.
Attention/Habituation

LO 4.11 Attention and Habituation Changes

- Attention studied using habituation and dishabituation
- Habituation-gradual decrease in attention
- Dishabituation-revival of attention with a new stimulus
Attention/Habituation
LO 4.11 Attention and Habituation Changes

- Neonates- several minutes before dishabituation
- 4-5 month-olds- only several seconds
- Infants become better at perceiving and processing stimuli
- End of first year- joint attention highlights social attention
Memory
LO 4.12 Short-term and Long-term Memory

- Short Term memory improves during first year of life
  - Object permanence tasks show infants can remember more locations of hidden objects
- Long Term memory increases as well
- Difference between recognition memory and recall memory
Assessing Infant Development

- Arnold Gesell – four subscale assessment tool
  - Motor skills
  - Language Use
  - Adaptive behavior
  - Personal-Social behavior

- Development Quotient (DQ)
Assessing Infant Development

• Bayley produced a contemporary measure of infant development
• 3 main scales:
  ▪ Cognitive
  ▪ Language
  ▪ Motor
• Not predictive of later IQ, but can be used as a screening tool
Assessing Infant Development

LO 4.13 Assessing Infant Development

- Information processing model uses habituation to assess intelligence
- Infants with short habituation time, process information more quickly
- Longitudinal studies have shown a connection between habituation time and IQ and higher achievement
Media Stimulation
LO 4.14 Educational Media

• “Mozart” effect led to creation of educational videos and DVDs
  ▪ Most studies have not supported the effectiveness of education CDs and videos

• Effective ways to encourage cognitive interaction includes talking, reading, responding and patience
### Table 4.2 Milestones of Infant Language Development

<table>
<thead>
<tr>
<th>Age</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months</td>
<td>Cooing (preverbal and gurgling sounds)</td>
</tr>
<tr>
<td>4–10 months</td>
<td>Babbling (repetitive consonant–vowel combinations)</td>
</tr>
<tr>
<td>8–10 months</td>
<td>First gestures (such as “bye-bye”)</td>
</tr>
<tr>
<td>10–12 months</td>
<td>Comprehension of words and simple sentences</td>
</tr>
<tr>
<td>12 months</td>
<td>First spoken word</td>
</tr>
</tbody>
</table>

**Note:** For each milestone there is a normal range, and babies who are somewhat later in reaching the milestones may nevertheless have normal language development.
• Many cultures use infant-directed speech to speak to infants
  ▪ Higher Pitch with simplified grammar
  ▪ Exaggerated intonation and phrases repeated
• Infants seem to prefer this speech and is common in many cultures
• Some cultures do not speak to infants in any special way
• No consistent negative effects in cultures with no IDS
Emotional and Social Development
Temperament

• Temperament-innate tendencies that are the raw material of personality
  ▪ Composed of activity level, adaptability, intensity of reactions and quality of mood
  ▪ Classified as:
    – Easy
    – Difficult
    – Slow to warm up

• Current research adds self-regulation or sociability
Goodness of Fit

LO 4.18 Goodness-of-fit

- Goodness-of-fit match between temperament and environmental demands
  - Babies with negative temperamental qualities did better with tolerant parents
- Cultures value different traits leading to cultural goodness of fit
  - Asian babies less active as this is culturally important
### TABLE 4.3 Three Conceptions of Infant Temperament

<table>
<thead>
<tr>
<th>Quality</th>
<th>Thomas and Chess</th>
<th>Quality</th>
<th>Description</th>
<th>Quality</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity level</td>
<td>Ratio of active time to inactive time</td>
<td>Activity level</td>
<td>Frequency and intensity of gross motor activity</td>
<td>Activity</td>
<td>Overall activity level</td>
</tr>
<tr>
<td>Attention span</td>
<td>Length of time devoted to an activity before moving on to the next</td>
<td>Attention span/persistence</td>
<td>Duration of attention to a single activity</td>
<td>Attention span</td>
<td>Duration of attention to a single activity</td>
</tr>
<tr>
<td>Intensity of reaction</td>
<td>Emotional expressiveness, e.g., crying, laughing</td>
<td>Fearful distress</td>
<td>Fear/distress in response to novel or intense stimulation</td>
<td>Emotionality</td>
<td>Emotional reactivity</td>
</tr>
<tr>
<td>Rhythmicity</td>
<td>Regularity of physical functions such as feeding and sleeping</td>
<td>Irritable distress</td>
<td>Expression of distress when frustrated</td>
<td>Soothability</td>
<td>Responsiveness to attempts to soothe when distressed</td>
</tr>
<tr>
<td>Distractibility</td>
<td>Extent to which new stimulation stops current behavior, e.g., when crying</td>
<td>Positive affect</td>
<td>Frequency of expression of happiness and other positive emotions</td>
<td>Sociability</td>
<td>Degree of interest in others, positive or negative responses to social interactions</td>
</tr>
<tr>
<td>Approach/Withdrawal</td>
<td>Response to new object or person</td>
<td>Self-regulation</td>
<td>Ability to suppress an initial response to a situation and execute a more adaptive response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptability</td>
<td>Adjustment to changes in routines</td>
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</tr>
<tr>
<td>Threshold of responsiveness</td>
<td>Stimulation required to evoke a response</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of mood</td>
<td>General level of happy versus unhappy mood</td>
<td></td>
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</tr>
</tbody>
</table>

**Source:** Based on: Buss & Plomin (1984); Rothbart et al. (2000); Thomas & Chess (1977).
Infant Emotions
LO 4.19 Primary Emotions

• Primary emotions are basic emotions we share with other animals
• Secondary emotions develop later and are called socio-moral emotions
• Primary emotions- distress, interest and pleasure in first weeks of life
  ▪ Becomes anger, sadness, fear, surprise and happiness
Infant Emotions
LO 4.19 Primary Emotions

• Anger as being separate from crying occurs by 7 months of age
• Sadness is rare unless mothers are depressed
• Fear- by 6 months of age
  ▪ Fear seems to occur with stranger anxiety
• Surprise -about 6 months of age
• Happiness-2 to 3 months
Infants’ Emotional Perceptions

LO 4.20 Infants’ Emotional Perceptions

- Emotional contagion - crying in response to hearing another cry
- At first, infants perceive emotions better by hearing than seeing
- Still-face paradigm shows infants quickly learn to expect certain emotional reactions
- By 7 months - can match auditory to visual emotions
- By 9-10 months - show social referencing
Cultural Themes of Infant Social Life

1. Infants are with their mothers for the early months of life
2. After 6 months, most daily care done by older girls rather than the mother
3. Infants are among many other people in the course of the day

LO 4.21 Infants’ Social Worlds
Cultural Themes of Infant Social Life

4. Infants are held or carried almost constantly
5. Fathers are usually remote or absent during first year

LO 4.21 Infants’ Social Worlds
• Erikson’s First stage focuses on trust versus mistrust
• Centers around the emotional and social bond and not the biological bond
• Developing trust in infancy provides foundation for future social development
Bowlby’s attachment theory focused on early quality relationships as well. It focused on primary caregiver being sensitive and responsive. The theory has its origins in evolutionary theory and research on mother-offspring relationships in animals.