

In This Chapter

- Setting the Context
- Basic Newborn States
- Sensory and Motor Development
- Cognition
- Language: The Endpoint of Infancy

Setting the Context: The Expanding Brain

- **Cerebral cortex**
 - Outer furrowed mantle of brain
 - Site of every conscious perception, action, thought
 - Influences behavior a few months after birth
 - Brain volume quadruples during first 4 years



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The Expanding Brain

- Neurons formed during fetal period
- After birth, **synaptogenesis** occurs
 - Proliferation of connections at the synapses
 - **Pruning** follows
- **Myelination**: formation of fatty layer encasing axons
 - Visual cortex myelinated by 1 year
 - Frontal lobes, age 20 or beyond

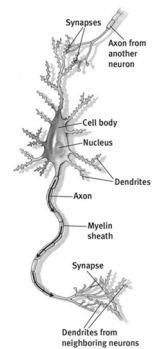


Figure 3.1
Belsky, *Experiencing The Lifespan*, 4e © 2016 Worth Publishers

Neural Pruning and Brain Plasticity

- **Plasticity:** Cortex malleable particularly during infancy and early childhood before pruning is complete
 - Plasticity allows other brain regions to compensate following injury
 - Brain is less plastic following childhood

LEARN THE TERMS

- Cerebral cortex
- Axon
- Dendrite
- Synapse
- Synaptogenesis
- Myelination
- Plastic

Basic Newborn States

- **Eating**
 - Amazing changes occur during infancy
- **Reflexes**
 - Automatic responses or actions programmed by non-cortical brain centers
 - Present at birth; promote survival



Rooting



Sucking



Grasping

Breast Milk: Nature's First Food

- **Breast-feeding pronouncements have undergone historical shifts**
 - Currently recommended by AAP and UNICEF for first 6 months
 - Protects from diseases
- **Correlational studies show that breast-fed babies**
 - Experience fewer gastrointestinal problems and middle ear infections
 - Are more resistant to colds and flu
 - Appear to be superior in later measures of intelligence in elementary school
- **Breast-feeding challenges**
 - Mothers' need to work
 - Cultural attitudes toward breast-feeding
 - Inability to breast-feed for some mothers

Malnutrition: A Serious Developing-World Concern

- In recent decades, stunting rates declined in poor regions of the world; stunting still affects 209 million children, roughly two in five developing-world girls and boys
 - **Undernutrition:** Chronic lack of adequate food
 - Kwashiorkor: lack of protein, amino acids
 - Micronutrient deficiencies
 - **Stunting:** Excessively short stature caused by chronic inadequate nutrition
 - Below 5th percentile in height norms for their age
 - Takes serious toll on cognition, health, and every activity of life

Percentage of Stunted Children Under Age 5 in the Developing World

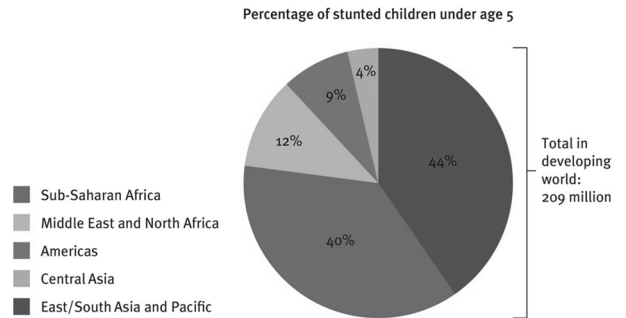


Figure 3.3
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United States: Developed Country

- **Food insecurity in U.S.**
 - Concern for lack of sufficient funds for food
 - 1 in 5 mothers report this fear
- **Severe food insecurity in U.S.**
 - 1 in 10 mothers report lack of food for children
- **U.S. Federal Nutrition Programs for Children**
 - Food Stamps (now SNAP/Supplemental Nutrition Assistance Program)
 - Special Supplemental Nutrition Program for Women Infants, and Children (WIC)
 - Child and Adult Care Food Program (CACFP)

LEARN THE TERMS

- Reflex
 - Sucking reflex
 - Rooting reflex
- Undernutrition
- Stunting
- Micronutrient deficiency
- Food insecurity

Crying: The First Communication Signal

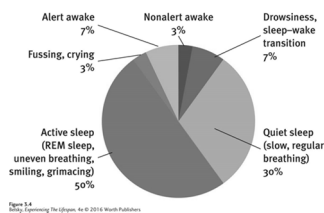
- **Crying**
 - Lifetime peak at about 5 weeks
 - Distinctive change in crying happens at 4 months
 - Vital to survival
- **Colic**
 - Frantic, continual crying during first 3 months
 - Immature digestive system
 - May contribute to parental stress, but is temporary

Interventions: What Quiets a Young Baby?

- **Crying and quieting undergo developmental changes**
 - Pacifier, breast, bottle
 - Swaddling
 - Kangaroo care
 - Hold close to body
 - Infant massage

Sleeping: The Main Newborn State

- **Newborns**
 - Sleep 18 hours a day
 - Wake every 3-4 hours
- **6 months**
 - May sleep 6 hours a night
- **1 year**
 - 12 hours a night and naps during day



Sleep Cycles

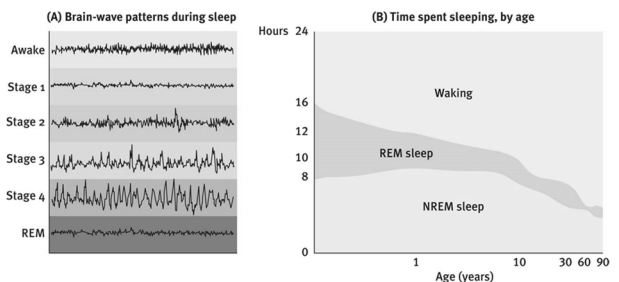


Figure 3.5ab
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Brain-wave patterns and lifespan changes in sleep and wakefulness

Interventions: What Helps a Baby Self-Soothe?

- **Bidirectional influences:** Sleep deprivation contributes to irritability in parents and infant
 - By 6 months, upon waking, infants can self-soothe.
- **What do experts suggest?**
 - Real key to promoting infant sleep is to put a baby to bed with love.
 - Erikson and Bowlby: Sensitive response to crying infant during first year
 - Behaviorists disagree: Do not respond.

Where do you stand?

What does the relevant research reveal about the following co-sleeping stereotypes?

- Co-sleeping makes a child less independent and mature.
- Co-sleeping disrupts parents' and children's sleep.
- Co-sleeping is dangerous because it can cause a baby to be smothered.

Sudden Infant Death Syndrome: SIDS

- 1 in 1,000 in the United States; top-ranking cause of infant death in the developed world.
- Possible relationship with too few or too many neurons in area of brain
- Peak risk zone 1 to 10 months
- Reduce risk:
 - When infants sleeps, place infant on his/her back
 - Keep away from fluffy bedding
 - Utilize baby sleeping-basket



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LEARN THE TERMS

- Colic
- Swaddling
- Kangaroo care
- REM sleep
- Self-soothing
- Co-sleeping
- Sudden infant death syndrome (SIDS)

Sensory and Motor Development

What do newborns see?

- Researchers
 - Use the **preferential-looking paradigm** and **habituation** techniques
 - Observe changes in the infant's interest in a stimulus from extreme interest to habituation, and finally renewed interest to another new stimulus
- Capabilities
 - With a visual acuity score of roughly 20/400 (versus ideal adult 20/20), a newborn would qualify as legally blind in many states; 20/20 by about year 1

Focusing on Faces

• Newborns

- Prefer faces to other stimuli, especially mother's face
- Prefer attractive-looking people
- Mimic facial expressions
- Prefer new faces of every ethnicity at 3 months; only discriminate between faces of own ethnicity at 9 months

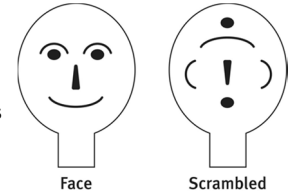


Figure 3.4
Baby: Experiencing The Lifespan, 4e © 2016 Worth Publishers

Newborns looked most at face-like drawing.

Are we biologically programmed to selectively look at faces?

Sensory and Motor Development

- **Hearing**
 - In the womb, fetuses can discriminate different tones
- **Smell**
 - Within the 1st week, infants prefer smell of breast milk
- **Taste**
 - Infants stop sucking and wrinkle face in response to bitter, sour, or salty tastes
 - Avidly suck on sweet solutions

Seeing Depth and Fearing Heights

• Visual cliff

- When 8 month-old babies begin to crawl, they perceive differences in depth and fear heights

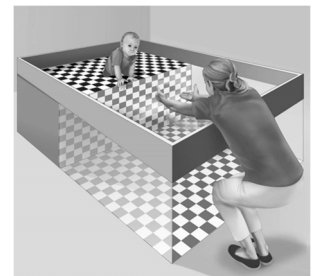


Figure 3.7
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Visual Cliff

Expanding Body Size and Mastering Motor Milestone

- **Body Growth**
 - Most pronounced in infancy
 - Slows during childhood
 - Increases during preadolescence
- **Motor milestones**
 - Cephalocaudal
 - Proximodistal
 - Mass-to-specific



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Variations Related to Infant Mobility

- **Traditional view:** Motor milestones viewed as static stages (e.g., sit, crawl, walk)
- **Contemporary researchers:** Variability and ingenuity of efforts to move acknowledged (e.g., belly-crawling, scooting)
 - Rate at which babies master motor milestones has no relation to later intelligence.
 - Developmental disorders are the exception
- Motor milestones have widespread effects

LEARN THE TERMS

- Preferential-looking paradigm
- Habituation
- Face-perception studies
- Depth perception
- Visual cliff
- Baby-proofing

Cognition: Piaget

Piaget	Stages: Focus on Infancy	Basic Principles
<ul style="list-style-type: none"> • Studied his own children • Stage approach 	<ul style="list-style-type: none"> • Sensorimotor • Preoperations • Concrete operations • Formal operations 	<ul style="list-style-type: none"> • Schemas • Assimilation • Accommodation • Adaptation

Circular Reactions: Habits That Pin Down Reality

Repetitive action-oriented schemas (habits)

- Through circular reactions, the infant explores and incorporates new information into existing schemas

Primary circular reactions (1 to 4 months)

- Infant's first habits (body-centered)

Secondary (about 4 months to 1 year)

- Infant explores environment

Tertiary (begin about 1 year)

- "Little scientist" activities (baby explores the properties of objects)

Tracking Early Thinking

• Evidenced by

– Deferred imitation

- When infant repeats an action observed at an earlier time

– Means end behavior

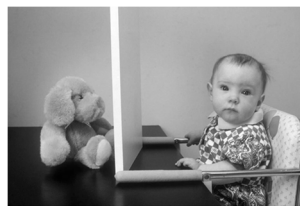
- Occurs about 1 year, when infant performs a different or separate action to reach a goal

– Limitation in Thinking: A-not-B error

- Approaching year 1, even though a baby sees an object hidden in a second hiding place, he/she returns to the originally viewed hiding place to find it.

Object-Permanence: Sensorimotor Stage

- Understanding that objects exist even when out of sight
- Around 5-6 months, infants begin to look for hidden objects
- At about 8 months infant develops **object permanence** ("little-scientist stage")



A minute ago, this 4-month-old girl was delightfully grabbing this little dog but, when this barrier blocked her image, it was "out of sight, out of mind."

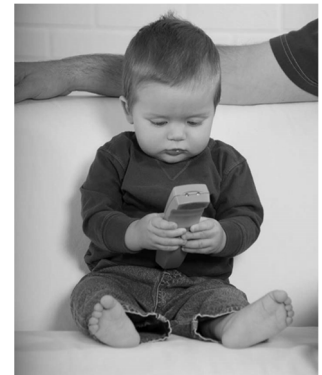
Critiquing Piaget

• Contributions

- Transformed perceptions of childhood

• Criticisms

- Infants grasp physical reality basics before age 1
- Understanding of physical reality develops gradually



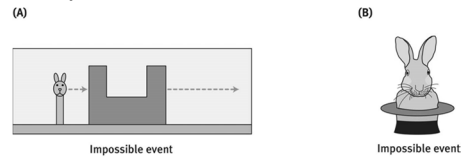
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LEARN THE TERMS

- Sensorimotor stage
- Circular reactions
- Primary circular reactions
- Secondary circular reactions
- Tertiary circular reactions
- Little-scientist phase
- Means-end behavior
- Object permanence
- A-not-B error

Cognition: A New Perspective

- **Information-processing:** A perspective on understanding cognition that divides thinking into specific steps and component processes, much like a computer



Two Impossible Events

Infant Memory and Conceptual Abilities

- **Memory**
 - Babies as young as 9 months can remember events from previous day (deferred imitation)
- **Forming categories**
 - By 7 to 9 months of age, babies can distinguish between animals and vehicles
- **Understanding numbers**
 - By about 5 months, infants can make differentiations between different numbers

Tackling the Core of What Makes Us Human: Infant Social Cognition

- **Social cognition**
 - Refers to any skill related to understanding feelings and negotiating interpersonal interactions
 - Inferences made about people's inner feelings and goals, based on their actions
 - Begins as early as 5 months
- **Joint attention**
 - First sign of getting human intentions when a baby looks at an object to which an adult points or the infant follows a person's gaze

Infant Social Cognition

- After seeing this video sequence of events, even infants under 6 months of age preferentially reached for the “nice” tiger rather than the “mean dog”.
- This shows that the fundamental human social-cognitive awareness, “he’s acting mean or nice” emerges at a remarkably young age.



LEARN THE TERMS

- Information-processing approach
- Social cognition

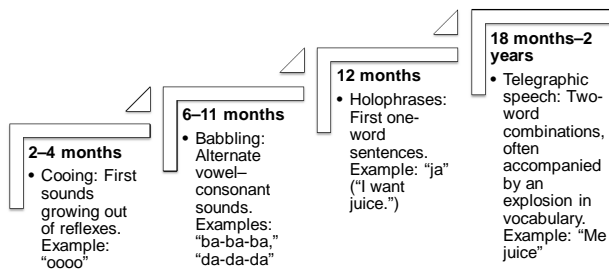
Language: The Endpoint of Infancy

- Noam Chomsky’s **nature-oriented** concept: Language Acquisition Device (LAD)
 - Hypothetical brain structure that enables our species to learn and produce language
 - Unique to our human species
- Chomsky’s concept is in opposition to Skinner’s **nurture-oriented** perspective
 - Language learned by being reinforced for producing specific words

Language: Social-Interactionist View

- The specific language learned is dependent on nurture—the place where a person is reared.
- Presently, **social-interactionist** view:
 - Interactions between baby and caregivers—each wants to communicate, one encourages the other
 - Emphasis on the social function of language

Language Milestones from Birth to Age 2



Language: Basic Principles

- **Telegraphic speech**
 - First word-combining stage
- **Infant-directed speech (IDS)** from caregivers
 - Higher-pitched, elongated vowels, and exaggerated tones attract baby's interest
 - Research suggests that IDS helps babies to master language

The relationship between grey matter (synaptogenesis) concentration in the cerebellum at 7 months of age and language comprehension at a child's first birthday

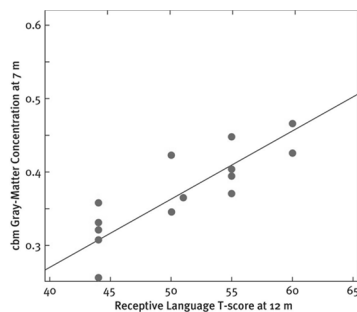


Figure 3.9
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