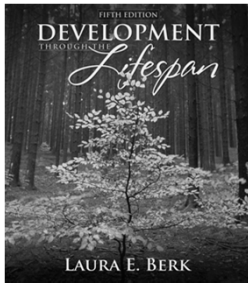


# Development Through the Lifespan



## Chapter 4 Physical Development in Infancy and Toddlerhood

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## Body Growth

Gain 50% in height  
from birth to age 1

- 75% by age 2

Grow in spurts

- gain “baby fat” until about 9 months, then get slimmer
- girls slightly shorter, lighter than boys



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## Body Growth During First Two Years



Figure 4.1

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## Growth Trends

### Cephalocaudal

“Head to tail”

Lower part of body  
grows later than the  
head

### Proximodistal

“Near to far”

Extremities grow  
later than head,  
chest, and trunk

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## Major Milestones of Brain Development

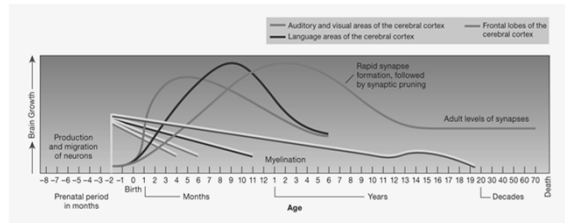


Figure 4.3

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## Regions of the Cerebral Cortex

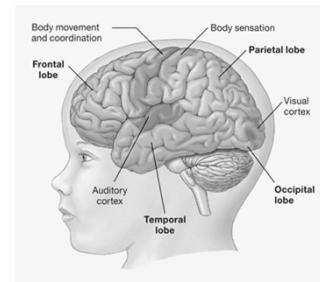


Figure 4.5

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## Lateralization of Cerebral Cortex

### Left Hemisphere

Sensory information and control of right side of body

Verbal abilities

Positive emotion

Sequential, analytical processing

### Right Hemisphere

Sensory information and control of left side of body

Spatial abilities

Negative emotion

Holistic, integrative processing

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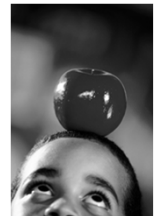
## Brain Plasticity

In infants and young children, parts of brain are not yet specialized.

Recover better from brain injury

- language recovers better than spatial skills
- still have some problems with complex mental skills

Older children, even adults, have some plasticity.



Dynamic Graphics

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## Synaptic Development

### Plasticity

- The brain's ability to change in response to experience

### Changes in psychological functioning

- Tied to changes in the brain throughout the lifespan

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## Sensitive Periods in Brain Development

Stimulation is vital when brain growing rapidly



Dynamic Graphics

### Experience-expectant growth

- ordinary experiences "expected" by brain to grow normally

### Experience-dependent growth

- additional growth as a result of specific learning experiences

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## Evidence of Sensitive Periods

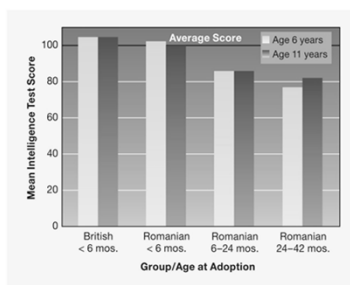


Figure 4.6

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## Changing States of Arousal

Sleep moves to an adult-like, night-day schedule during the first year.

Sleep needs decline from 18 to 12 hours a day by age 2.

Affected by social environment, cultural values



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## Influences on Early Growth

Heredity

Nutrition

- breast vs. bottle-feeding

Malnutrition

Emotional well-being

- problems can cause nonorganic failure to thrive



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## Malnutrition

Types	Consequences
Marasmus	Physical symptoms, learning problems
Kwashiorkor	Growth and weight problems
Food insecurity	Growth, learning problems

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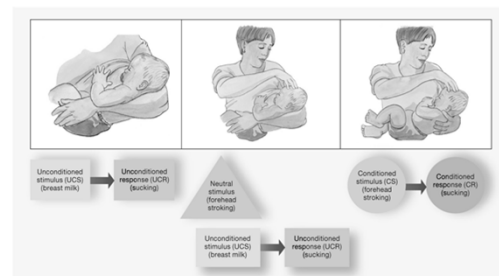
## Emotional Well-Being

Nonorganic failure to thrive

- symptoms similar to marasmus
- non-biological cause
- can be corrected if treated early



## The Steps of Classical Conditioning



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Figure 4.7

## Operant Conditioning Terms

### Reinforcer

*Increases probability of behavior occurring again*

- presenting desirable stimulus
- removing unpleasant stimulus

### Punishment

*Reduces probability of behavior occurring again*

- presenting unpleasant stimulus
- removing desirable stimulus

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## Using Habituation to Study Infant Memory and Knowledge

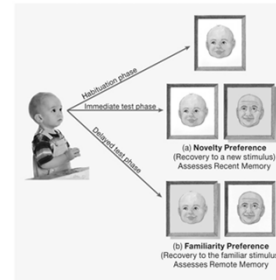


Figure 4.8

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## Imitation

Newborns have ability to imitate

- reflex or voluntary capacity?

Mirror neurons offer biological explanation

Powerful means of learning

Helps facilitate positive relationships



## Motor Development: Sequence and Trends

Gross motor development

- crawling, standing, and walking

Fine motor development

- reaching and grasping

Sequence is fairly uniform, though individual rate of motor progress differs

Cephalocaudal and proximodistal trends

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## Motor Skills as Dynamic Systems

Increasingly complex systems of action with each skill

Each new skill is joint product of:

- CNS development
- body's movement capacity
- child's goals
- environmental supports

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## Sensory Skills

### Hearing

- 
- High-pitched noises need to be loud to be heard.
- Infants can locate the direction of some sounds at birth.

### Touch and Motion

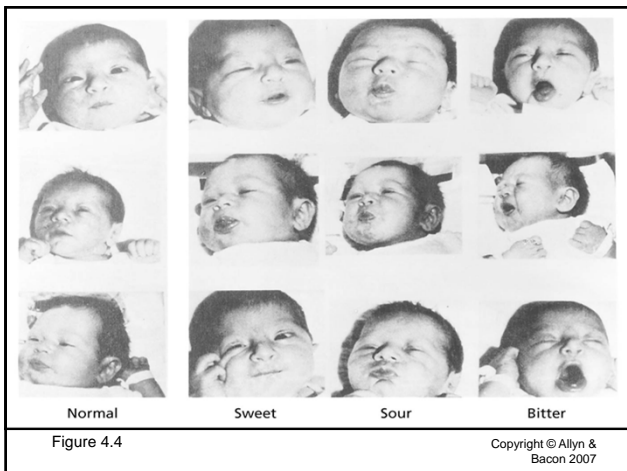
- Best developed of all senses

### Smelling and Tasting

- Newborns react differently to each basic taste as early as birth.
- Smell has nearly unlimited variations.

&


Bacon 2007



## Developments in Hearing

4–7 months	Sense of musical phrasing
6–8 months	“Screen out” sounds from non-native languages
7–9 months	Recognize familiar words, natural phrasing in native language

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## Listening

### Discriminating Speech Sounds

- At 1 month, can discriminate between *pa* and *ba*
- At 6 months, can discriminate between two-syllable words
- By 3 months, respond to male, female, and children's voices similarly
- At 6 months, distinguish sound contrasts in any language; by 1 year old, this ability fades
- Prefer the mother's voice above all others

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## Listening

### Discriminating Other Sounds


- At 6 months, babies listen to melodies and recognize patterns.

### Combining Information from Several Senses

- *Intersensory Integration*
  - Integrate information from several senses
- *Cross-modal Transfer*
  - Learning from one sense and transferring it to another sense

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## Improvements in Vision



Supported by rapid maturation of eyes and visual centers in brain

### Improvements

- 2 months: focus and color vision
- 6 months: acuity, scanning, and tracking
- 6–7 months: depth perception

FamilyLife  
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## Milestones in Depth Perception

3–4 weeks	■ Sensitivity to motion cues
2–3 months	■ Sensitivity to binocular cues
6–7 months	■ Sensitivity to pictorial cues ■ Wariness of heights

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## Milestones in Pattern Perception

1 month	Poor contrast sensitivity; prefer single, large simple patterns with high contrast
2–3 months	Can detect detail in complex patterns Scan internal features of patterns
4 months	Can detect patterns even if boundaries are not really present
12 months	Can detect objects even if two-thirds of drawing is missing

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## The Visual Cliff



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## Contrast Sensitivity

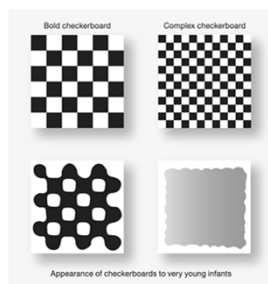


Figure 4.14

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## Subjective Boundaries in Visual Patterns

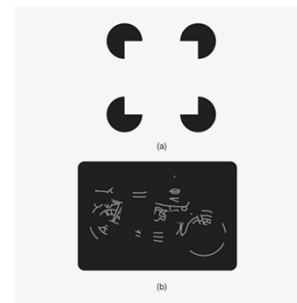


Figure 4.15

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## What Babies Look At

Babies initially scan for light/dark contrast.

At 2 months, babies scan entire objects to get a general idea.

Caron and Caron (1981) suggest that by 3 – 4 months babies can find and pay attention to patterns.

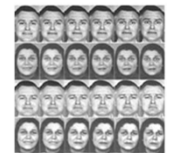
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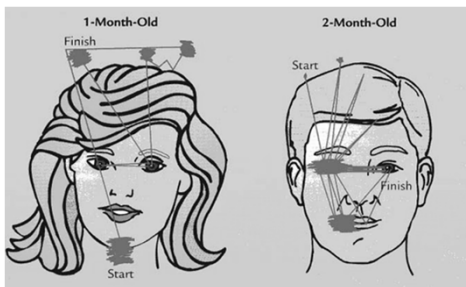
## What Babies Look At

### Faces

- Clearly prefer attractive faces
- Prefer the mother's face from the earliest hours of life



## Scanning Human Face Patterns



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## Milestones in Face Perception

Birth–1 month	Prefer simple, facelike pattern
2–4 months	<ul style="list-style-type: none"> <li>■ Prefer complex facial pattern to other complex patterns</li> <li>■ Can distinguish strange from familiar faces</li> <li>■ Prefer mother's face over stranger</li> </ul>
5–12 months	Can perceive emotional expressions on faces

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## Early Face Perception

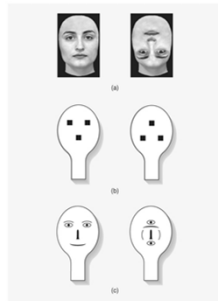


Figure 4.16

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## Milestones in Intermodal Perception

Birth	Detect amodal sensory properties
3–4 months	Relate speech sounds to lip movement
4–6 months	Perceive unique face-voice pairings of unfamiliar adults

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## Differentiation Theory

Infants:

- search for invariant features of the environment
- note stable relationships between features
  - visual patterns, intermodal relationships
- gradually detect finer and finer features
  - differentiation

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## Environment and Perceptual Differentiation



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Figure 4.17