Life-Span Development

Thirteenth Edition

Chapter 4: Physical Development in Infancy

Physical Growth and Development in Infancy

- Patterns of Growth:
  - Cephalocaudal Pattern: sequence in which the earliest growth always occurs from the top downward
  - Proximodistal Pattern: sequence in which growth starts in the center of the body and moves toward the extremities

Physical Growth and Development in Infancy

- Height and Weight
  - Average North American newborn is 20 inches long and 7 ½ pounds
  - At 2 years of age, infants weigh 26 to 32 pounds and are half their adult height.

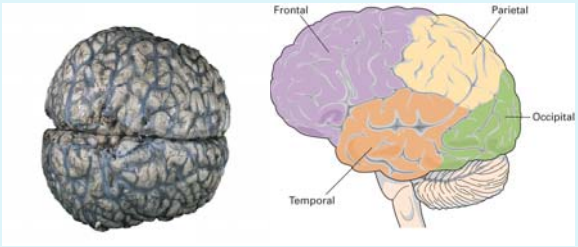
Physical Growth and Development in Infancy

- The Brain:
  - Contains approximately 100 billion neurons at birth
  - Extensive brain development continues after birth, through infancy, and later
  - Head should be protected
    - Shaken Baby Syndrome: brain swelling and hemorrhaging from child abuse trauma

Physical Growth and Development in Infancy

- The Brain:
  - The Brain's Development
    - At birth, the brain is 25% of its adult weight; at 2 years of age, it is 75% of its adult weight
  - Mapping the Brain
    - Frontal, Occipital, Temporal, and Parietal Lobes
    - Lateralization
      - Left-brained vs. Right-brained

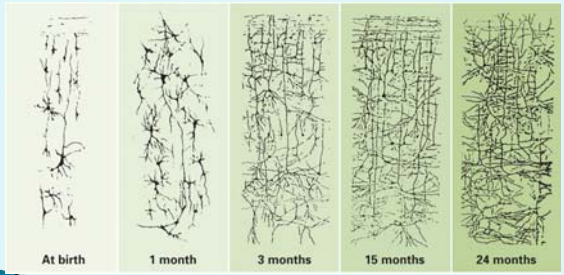
Physical Growth and Development in Infancy



Physical Growth and Development in Infancy

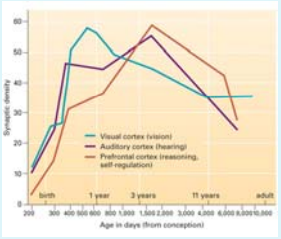
- The Brain:
  - Changes in Neurons
    - Continued myelination
    - Greater connectivity and new neural pathways
  - Changes in Regions of the Brain
    - Dramatic "blooming and pruning" of synapses in the visual, auditory, and prefrontal cortex

Physical Growth and Development in Infancy



Physical Growth and Development in Infancy

- Changes in regions of the brain:
  - "Blooming and pruning" of synapses varies by brain region
  - Pace of myelination varies as well



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Physical Growth and Development in Infancy

- The Brain:
  - Early Experience and the Brain
    - Depressed brain activity has been found in children who grow up in a deprived environment
    - Repeated experience wires (and rewires) the brain
    - Brain is both flexible and resilient

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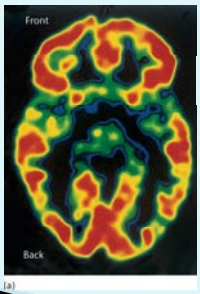
Physical Growth and Development in Infancy

The Brain



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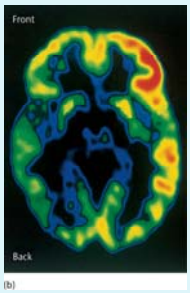

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Physical Growth and Development in Infancy

- Sleep
  - Typical newborn sleeps 18 hours per day
  - Infants vary in their preferred times for sleeping
  - Most common infant sleep-related problem is night waking
    - Consistently linked to excessive parental involvement in sleep-related interactions with their infant

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Physical Growth and Development in Infancy

- Sleep
  - REM Sleep – eyes flutter beneath closed lids
    - Sleep cycle begins with REM sleep in infants
    - May provide infants with added self-stimulation
    - REM sleep may also promote brain development
    - We do not know whether infants dream or not

Physical Growth and Development in Infancy

- Sleep
  - Shared Sleeping
    - Varies from culture to culture
    - American Academy of Pediatrics discourages shared sleeping
    - Potential benefits:
      - Promotes breast feeding and a quicker response to crying
      - Allows mother to detect potentially dangerous breathing pauses in baby

Physical Growth and Development in Infancy

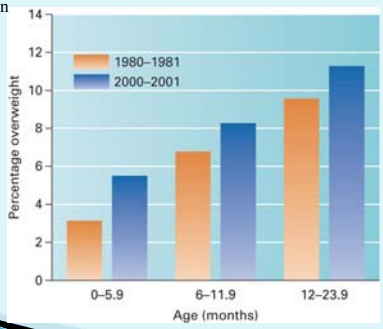
- Sleep
  - SIDS (Sudden Infant Death Syndrome): infants stop breathing and die without apparent cause
    - Highest cause of infant death in U.S. annually
    - Highest risk is 2-4 months of age
    - Many other risk factors associated with SIDS

Physical Growth and Development in Infancy

- Nutrition
  - Nutritional Needs and Eating Behavior
    - 50 calories per day for each pound they weigh
    - Fruits and vegetables by end of 1st year
    - Poor dietary patterns lead to increasing rates of overweight and obese infants
    - Breast feeding reduces risk of obesity

Physical Growth and Development in Infancy

Nutrition



Physical Growth and Development in Infancy

- Nutrition
  - Breast Versus Bottle Feeding
    - Consensus: Breast feeding is better
    - American Academy of Pediatrics strongly endorses breast feeding throughout the first year
    - Numerous outcomes for child and mother

Physical Growth and Development in Infancy

- Nutrition
  - Malnutrition in Infancy
    - Early weaning can cause malnutrition
    - Two life-threatening conditions resulting from malnutrition
      - Marasmus: a severe protein-calorie deficiency resulting in a wasting away of body tissues
      - Kwashiorkor: a severe protein deficiency that causes the abdomen and feet to swell with water
    - Severe and lengthy malnutrition is detrimental to physical, cognitive, and social development

Motor Development

- The Dynamic Systems View:
  - Infants assemble motor skills for perceiving and acting
    - Motor skills represent solutions to goals
  - Development is an active process in which nature and nurture work together as part of an ever-changing system

Motor Development

- Reflexes: built-in reactions to stimuli; automatic and inborn
  - Rooting Reflex
  - Sucking Reflex
  - Moro Reflex
  - Grasping Reflex
- Some reflexes continue throughout life; others disappear several months after birth

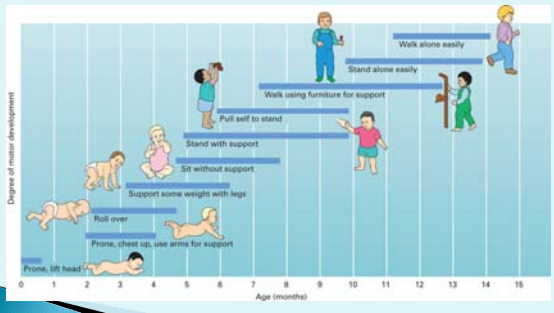
Motor Development

- Gross Motor Skills: large-muscle activities
  - The Development of Posture
    - Posture – a dynamic process linked with sensory information in the skin, joints, and muscles, which tell us where we are in space
  - Learning to Walk
    - Occurs about the time of their first birthday
    - Infants learn what kinds of places and surfaces are safe for locomotion

Motor Development

- Gross Motor Skills: large-muscle activities
  - The First Year: Motor Development Milestones and Variations
    - Some milestones vary by as much as two to four months
    - Experience can modify the onset of motor accomplishments
    - Some infants do not follow the standard sequence of motor development

Motor Development



Motor Development

- Gross Motor Skills
  - Development in the Second Year
    - Toddlers become more skilled and mobile
    - By 13-18 months, toddlers can pull a toy or climb stairs; by 18-24 months, toddlers can walk quickly, balance on their feet, walk backward and stand and kick a ball
  - Even when motor activity is restricted, many infants reach motor milestones at a normal age

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Motor Development

- Fine Motor Skills: finely tuned movements
  - Using a spoon, buttoning a shirt, reaching and grasping
  - Palmer grasp: grasping with the whole hand
  - Pincer grip: grasping with the thumb and forefinger
  - Perceptual-motor coupling is necessary for infants to coordinate grasping

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Sensory and Perceptual Development

- What are Sensation and Perception?
  - Sensation: occurs when information interacts with sensory receptors (eyes, ears, tongue, nostrils, and skin)
  - Perception: the interpretation of what is sensed

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Sensory and Perceptual Development

- What are Sensation and Perception?
  - Ecological View: we directly perceive information that exists in the world around us
    - Affordances: opportunities for interaction offered by objects that fit within our capabilities to perform activities

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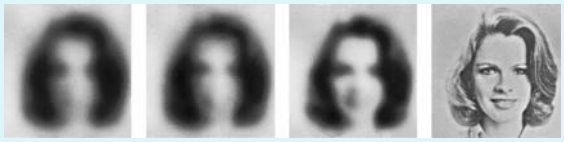
Sensory and Perceptual Development

- Visual Perception
  - Visual Acuity and Human Faces
    - Newborn's vision is about 20/240 but 20/40 by 6 months of age
    - Infants show an interest in human faces soon after birth
      - Spend more time looking at their mother's face than a stranger's face as early as 12 hours after being born
      - A 2-month-old scans much more of the face than the 1-month-old
  - Color Vision

Sensory and Perceptual Development

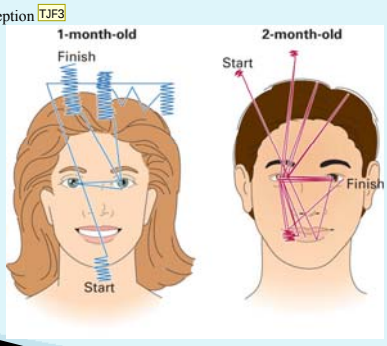
Visual Perception TJF2



1 month | 2 months | 3 months | 1 year

Sensory and Perceptual Development

Visual Perception TJF3



Sensory and Perceptual Development

- Visual Perception
  - Perceptual Constancy: sensory stimulation is changing but perception of the physical world remains constant
    - Size Constancy: recognition that an object remains the same even though the retinal image of the object changes
      - Babies as young as 3 months show size constancy
    - Shape Constancy: recognition that an object remains the same shape even though its orientation to us changes

Slide 30

TJF2 Different woman in this figure 4.20 in text, okay?
Thomas Finn, 7/20/2010

Slide 31

TJF3 Figure not in text. Okay?
Thomas Finn, 7/20/2010

Sensory and Perceptual Development

- Visual Perception
  - Depth Perception
    - Eleanor Gibson and Richard Walk studied development of depth perception using a "visual cliff"
    - Infants 6-12 months old can distinguish depth
  - Nature, Nurture, and the Development of Infants' Visual Perception

Sensory and Perceptual Development

Depth Perception TJF4

Sensory and Perceptual Development

- Other Senses
  - Hearing
    - Fetuses can hear and learn sounds during the last two months of pregnancy and can recognize their mother's voice at birth
  - Touch and Pain
    - Newborns do respond to touch and can also feel pain

Sensory and Perceptual Development

- Other Senses
  - Smell
    - Newborns can differentiate odors
  - Taste
    - Sensitivity to taste may be present before birth

Slide 34

TJF4 Different photo in book for figure 4.22.
Thomas Finn, 7/20/2010

Sensory and Perceptual Development

- Intermodal Perception: the ability to integrate information from two or more sensory modalities
- Perceptual–Motor Coupling: perception and action are coupled
  - Action educates perception