

Chapter 7: Physical Development in Early Childhood

- McGraw's study of Johnny and Jimmy was an early demonstration of the interplay between nature and nurture
- Early childhood, AKA the "play" or preschool years, is from ages 2-5
- Normative development: the pattern of development that is typical or average
- Individual differences: the variation among individuals on a characteristic as well as what is typical or normative
- Physical Growth and Development
 - The rapid growth that characterizes infancy slows in early childhood
 - A typical preschooler is leaner than his baby brother and his teenage sister
 - Patterns of Normative Growth
 - The first scientific studies of physical growth were designed to establish norms (standards of what is typical for different ages)
 - Cross-sectional research design is often used
 - Studies have been used to create growth curve tables of normative development based on heights and weights of children of different ages
 - Growth curves suggest that physical development is slow and steady during early childhood
 - On average, children grow 2.5 inches and gain 6 pounds per year
 - Boys are slightly heavier and taller than girls, but sexes are similar in body proportion
 - When provided with healthy growth conditions, children from various parts of the world follow similar growth patterns
 - Growth is episodic (occurring in fits and starts)
 - Characterizes growth in height, weight, head circumference, and other measures
 - Individual Differences
 - Body Mass Index (BMI): weight (kg) divided by height (meters) squared
 - Helps judge whether a child's weight is appropriate for his height
 - Average: 50th percentile
 - 85th-94th percentile: overweight
 - 95th+: obese
 - 5th percentile or lower: clinically underweight
 - 80% of children are within normal range for BMI
 - Heredity is important
 - About 2/3 of statistical variations of height and weight can be attributed to genetic factors
 - Changes in diet and physical health have resulted in increases in height and weight within families in the last 100 years in the US, Europe, and Asia
 - Diet and Nutrition
 - Two changes in eating patterns coincide in early childhood
 - Children's appetites decrease
 - Graduating from baby food to adult food
 - Some preschoolers are picky eaters, between 18 and 29%

- When parents insist that kids clean their plates, kids don't learn how to listen to internal hunger cues
 - Danger that children will learn to over eat
 - Childhood obesity had reached epidemic levels; estimated that around 9 million US children are obese and many more are at risk (overweight)
 - Serious health problems, like heart disease and diabetes are now being seen in young people
 - The best way to combat obesity is to prevent weight gain
 - Parents can lower the risk of overweight children by:
 - Providing children with a variety of healthy foods at meals and snack times, but not pressuring them to eat
 - Not using foods to bribe, punish, or entertain children
 - Encouraging, and joining in, active play and limiting sedentary past times, like watching TV
 - Serving as good role models, by practicing healthy eating habits and exercising themselves, and planning active family times
- Brain Development
 - o Brain matures both structurally and functionally during early childhood
 - o Important aspect of brain development is establishing and fine tuning communication between the brain and nervous system and within the brain
 - o REVIEW:
 - Brain is composed of billions of cells called neurons with specialized extensions
 - Dendrites: collect info and carry it to the body of the neuron
 - Axons: transmit info away from cell body
 - Connected by a synapse
 - Synapse enables information to pass from one neuron to the next
 - Neurotransmitters released when electrical impulses hit the tip of an axon
 - o Improvements in the Brain's Communication Network
 - Key process in the brain is synaptogenesis (the development of connections between neurons which occurs through the growth of axons and dendrites)
 - Peaks at about 1 year but continues into childhood and throughout life
 - Synaptic pruning: selective elimination of unused and unnecessary synapses
 - Equally important part of brain development
 - Begins in first years and continues into young adulthood
 - Synaptic density reduced by about 40% by adulthood
 - Selective elimination of some synapses while others are strengthened supports brain adaptations and plasticity by making the brain more efficient
 - Myelination: the process through which cell axons become sheathed in myelin (a white, fatty substance providing insulation and improving signal transmission)
 - Areas of brain involved with vision and movement are myelinate first
 - Early childhood: fibers connecting cerebellum to cerebral cortex grow and myelinate, improving children's balance and control of body movements
 - Myelination in areas that govern hand-eye coordination also continues through early childhood
 - Myelination of frontal lobes (most plastic area of the brain) continues into late adolescence and early adulthood

0 Mirror Neurons

- Discovery made in Italy at University of Parma during a study of monkeys
- Mirror neurons fired both when the monkeys were performing an activity and when observing an activity being completed by someone else
- Other scientist have found evidence of similar activity in humans with actions and experiencing another person's feeling or emotions
- May help explain why children learn so much from watching others

0 Brain Anatomy

- Changes in gray matter (working tissue of the brain's cortex) occur from early childhood into adulthood
- Overall size of the brain doesn't change very much in early childhood, but the relative size of specific structures does change
 - First areas to mature are those related to the most basic functions (senses and movement)
 - Next, parietal lobes (spatial orientation and language)
 - Last, prefrontal cortex (reasoning and executive functioning)
- Right hemisphere controls left side of body and vice versa due to lateralization (the localization of a function to one of the hemispheres of the brain)
 - Left hemisphere: time and sequences, processes speech, registers external stimuli
 - 0 Especially active from 3-6 years
 - Right hemisphere:
 - 0 Especially active from 3-11 years, with a small spurt from 8-10
 - Example of lateralization: handedness
- Corpus callosum: large bundle of fibers connecting the two hemispheres of the brain
 - Develops rapidly between 3 and 6 years
- Communication between 2 halves of the brain facilitates quicker and smoother action
- Frontal lobes: area of the brain that develops most in early childhood; sometimes called the executive of the brain; responsible for planning and organizing new actions, problem solving, and regulating emotions, as well as focusing attention
 - Rapid growth occurs from 3-6 years
 - Go/No-Go task, similar to Simon Says, illustrates differences in development of frontal lobes
- Effortful control: the ability to withhold a first response and choose another
 - Emerges during early childhood

0 Brain Plasticity

- Experience plays a huge role in sculpting the brain
- Brain plasticity: the degree to which the brain can be altered by experience
- Effects of experience on the brain depends on the brain maturity at the time of the experience
- Sensitive period: a time in development during which the organism is especially open to environmental influence
 - Level of skill achieved will not be as high once a sensitive period ends