Chapter 7
Physical and Cognitive Development in Early Childhood

Physical Development in Early Childhood
- Body Growth and Changes
- Motor Development
- Health and Wellness

Cognitive Development in Early Childhood
**Body Growth and Change**

- Height and Weight
- The Brain

**Height and Weight**

- Yearly ht. & wt. growth in early childhood averages 6.35 cm & 2.2 – 3.5 kg respectively.
- The % of ht. & wt. growth decreases with each yr.
- Body fat shows a steady decline during this time.
- Girls are slightly smaller & lighter than boys.
- Girls have more body fat; boys have more muscle tissue.
- Boys & girls slim down as their trunks lengthen.

**Individual Differences**

- Heredity accounts for much of the variation in body size.
- Meredith’s (1978) research identified the two most important contributors to height differences are:
  - Ethnic origin
  - Nutrition
Contributors to Short Stature
- Congenital Factors (genetic or prenatal problems)
- Physical Problems That Develop in Childhood
- Emotional Difficulties

The Brain
- The brain & the head grow more rapidly than any other part of the body.
- By age 3, the brain is three-quarters of its adult size; by age 5, the brain is 9/10th of its adult size.

Brain growth is affected by increases in the size & number of nerve endings & by myelination.
- Myelination (nerve cell insulation) increases the speed of neuron-to-neuron communication.
- Myelination is an important contributor to the maturation of many of the cognitive & physical abilities associated with early childhood.
- From 3–6 years of age, the most rapid brain growth occurs in the frontal lobe.
Motor Development

- Gross Motor Development
- Fine Motor Development
- Handedness

Gross Motor Skills

At age 3, children enjoy simple movements such as hopping, jumping & running just for the fun of it & the pride they feel in their accomplishment.

At 4 years of age, children become more adventurous—taking on jungle gyms & climbing stairs with one foot on each step.
Gross Motor Skills

At 5 years of age, children begin to perform hair-raising stunts on anything they can climb on, & they enjoy racing with each other or with parents.

Fine Motor Skills

At age 3, children are still clumsy at picking up very small objects between their thumb & forefinger.

3 year olds can stack objects to build towers.

By age 4, fine motor coordination improves & becomes more precise.
Fine Motor Skills

- By age 5, children are more interested in building houses, churches, & buildings with more detail rather than towers.

Development of Fine Motor Skills in Early Childhood

- 6-12 months:
  - Grip objects such as a cup
  - Grandmother’s glove
  - Rattle
  - Rattles with different sounds

- 12-18 months:
  - Draw a line with a crayon
  - Use a spoon to feed themselves
  - Use a fork to eat cereal

- 18-24 months:
  - Draw with a pencil
  - Build a tower with blocks
  - Write their name

- 24-30 months:
  - Build a tower with Legos
  - Cut with a scissors
  - Tie their shoes

- 30-36 months:
  - Draw a picture
  - Cut out shapes
  - Use a spoon to eat soup

Handedness

- Preference for one hand is linked with the dominance of one brain hemisphere with regard to motor performance.
- Right-handers have a dominant left hemisphere, while left-handers have a dominant right hemisphere.
- Evidence of handedness is present in infancy, as babies show preferences for one side of their body over the other.
- Many preschool children use both hands without a clear preference emerging until later in childhood.
- The origin of hand preference has been explored with regard to genetic inheritance & environmental experience.
Health and Wellness

- Energy Needs
- Eating Behaviour
- Wellness in Canada
- Wellness in Poor Countries

Energy Needs

- What children eat affects their skeletal growth, body shape, & susceptibility to disease.
- An average preschool child requires 1,700 calories per day.
- Energy requirements for children are determined by the basal metabolism rate (BMR): the minimum amount of energy a person uses in a resting state.

Energy Needs

- Differences in physical activity, basal metabolism, & the efficiency with which children use energy are among the possible explanation as to why children of the same age, sex, & size vary in their energy needs.
Eating Behaviour

- Children’s habits become ingrained very early in life; eating habits during the preschool years will establish later eating behaviours.
- Our changing lifestyles (eating on the run, fast-food meals etc.) contribute to the increased fat levels in children’s diets.
- Prevention of obesity in children is a critical health issue with long term health implications.

Hill & Trowbridge (1998) stress that food needs to be seen as a way to satisfy hunger & nutritional needs vs. proof of love, a reward, or entertainment.

Wellness in Canada

Childhood immunization is still necessary to prevent many childhood diseases such as chicken pox.

Unintentional injuries are the leading cause of death for children between the ages of 1-9.

Aboriginal children have poorer health overall.


Lower levels of vitamin C are associated with parental smoking.

Overall high child poverty rates exist.

Poverty adversely affects children’s health status in numerous ways.

Campaign 2000’s Report Card (2001) revealed that Canada has one of the highest rates of poverty among the world’s top 22 industrialized countries.

Single parent (primarily female led) families experience higher levels of poverty.

Aboriginal children have both higher levels of poverty & poorer overall health.

The health status of aboriginal children is a growing source of concern among health officials in Canada.
Wellness in Poor Countries

- Poverty & child health are worldwide concerns.
- Unicef (2000) identified that the poor are the majority in many of the world’s nations (1 in 5).
- The poor experience hunger, malnutrition, unsafe water, & inadequate health care.
- Dehydration (from diarrhea) is among the leading causes of childhood death in impoverished countries.
- The number of children with HIV/AIDS has increased dramatically in the past decade.

Piaget’s Preoperational Stage of Development

- Characteristics of the Preoperational Stage
- Definition of Operations
- Symbolic Function Sub-stage
- Intuitive Thought Sub-stage

Piaget’s Preoperational Stage

- The preoperational stage lasts from age 2–7 yrs.
- Stable concepts form, mental reasoning emerges, egocentrism begins, & magical beliefs are constructed.
- Thought is flawed & not organized.
- There is a transition from primitive to more sophisticated use of symbols.
- Operational thinking (ability to mentally do what one physically did) is not yet present.
Definition of Operations

- Operations are internalized sets of actions that allow the child to do mentally what before he/she did physically.

Symbolic Function Sub-stage

- The ability to think symbolically & to represent the world mentally predominates in this sub-stage (age 2-4 yrs.)
- Symbolic function is demonstrated by the child’s ability to mentally represent an object not present.
- Scribbling (drawing), language & pretend play are examples of symbolic function.
- Two important limitations in thought at this stage are egocentrism & animism.

Egocentrism

- Egocentrism is the inability to distinguish between one’s own perspective & someone else’s perspective.
- Egocentrism is characteristic of preoperational thought.
- Perspective-taking doesn’t develop uniformly in preschool children, as they frequently show perspective skills on some tasks but not others.
Animism

- Animism is the belief that inanimate objects have “lifelike” qualities & are capable of action.
- A child may believe that a tree pushes its leaves off in the fall, or that the sidewalk made him/her trip & fall down.
- Drawing in this stage is fanciful & imaginative.

Intuitive Thought Sub-stage

- Children in this stage (4-7 yrs.) begin to use primitive reasoning.
- Piaget used the term intuitive because children say they know something, but they know it without the use of rational thinking.
- Children in this stage ask a barrage of questions, signaling the emergence of their interest in both reasoning & understanding why things are the way they are.

Centration

- Centration is a major characteristic of preoperational thought.
- Centration is the focusing or centring of attention on one characteristic to the exclusion of all others.
- Young children’s lack conservation which is the awareness that altering an object’s or a substance’s appearance does not change its basic properties.
Vygotsky’s Theory

- The Zone of Proximal Development
- Scaffolding
- Language and Thought

The Zone of Proximal Development

- The zone of proximal development represents the range of tasks too difficult for children to master alone but which can be learned with the guidance & assistance of adults or more skilled children.
- Vygotsky’s emphasis on the ZPD underscores his belief in the importance of social influences, especially instruction, on children’s cognitive development.
The Zone of Proximal Development

- Vygotsky’s ZPD has a lower limit & an upper limit.
- The lower limit is the level of problem solving reached by the child working independently.
- The upper limit is the level of additional responsibility the child can accept with the assistance of an able instructor.

Scaffolding

- Scaffolding refers to changing the level of support.
- Over the course of a teaching session, a more skilled person adjusts the amount of guidance offered to fit the student’s current performance level.

Scaffolding

- Dialogue is an important tool of scaffolding in the zone of proximal development.
- The child’s unsystematic, disorganized, spontaneous concepts meet with the skilled helper’s more systematic, logical, & rational concepts.
- Through meeting & dialogue, the child’s concepts become more systematic, logical, & rational.
Language and Thought

- Vygotsky believed young children use language for social communication but also to plan, guide, & monitor their behaviour (self-regulation).
- Language used for self-regulation is called inner speech or private speech.
- For Piaget, private speech is egocentric & immature, but for Vygotsky it is an important tool of thought during early childhood.

Language and Thought (cont’d)

- Vygotsky believed all mental functions have social origins.
- Children must use language to communicate with others before they can focus on their own thoughts.
- Winsler, Diaz & Montero (1997) supported Vygotsky’s view of the positive role of private speech in early development.

Comparison of Vygotsky’s and Piaget’s Theories

- Vygotsky’s theory is a social constructivist approach, which emphasizes the social contexts of learning & that knowledge is mutually built/constructed.
- Piaget’s theory is a cognitive constructivist approach which does not have this social emphasis.
- Piaget believed children construct knowledge by transforming, organizing, & reorganizing previous knowledge.
- Vygotsky believed children construct knowledge through social interaction.
Comparison of Vygotsky’s and Piaget’s Theories (cont’d)

- The implication of Piaget’s theory for teaching is that children need support to explore their world and discover knowledge.
- The implication of Vygotsky’s theory for teaching is that students need many opportunities to learn with the teacher & with more skilled peers.
- Vygotsky’s theory has been embraced by many teachers & successfully applied to education.

Information Processing

- Attention
- Memory
- Strategies
- The Young Child’s Theory of Mind

Attention

- The child’s ability to pay attention changes significantly during the preschool years.
- Preschool children are influenced strongly by the features of a task that stand out, or are salient.
- This deficit can hinder problem solving or performing well on tasks.
- By age 6 or 7, children attend more efficiently to the dimensions of a task that are relevant.
- Developmentalists believe this change reflects a shift in cognitive control of attention.
Memory

- Short-Term Memory
- How Accurate Are Young Children’s Long-Term Memories?

Short-Term Memory

- Memory is central to cognitive development.
- Memory is the retention of information over time.
- Short-term memory increases in early childhood.
- In short-term memory, individuals retain information for up to 15–30 seconds without rehearsal.
- Rehearsal can help keep information in STM for a much longer period.

Differences in memory span occur due to:

- Rehearsal: older children rehearse items more than younger children.
- Speed & efficiency of processing information: the speed with which a child processes information is an important aspect of the child’s cognitive abilities.
How Accurate Are Young Children’s Long-Term Memories?

- Hammond & Fivush (1991) found young children can remember a great deal of information if they are given appropriate cues & prompts.
- Memories of preschoolers may seem erratic, but inconsistencies may be the result of inadequate prompts & cues.
- Hyman & Loftus’ (2001) research documented the susceptibility to being manipulated (led to false testimony through clues & prompts) existed for young children as court witnesses. Expert interviewers are recommended for young children.

Strategies

- Strategies consist of using deliberate mental activities to improve the processing of information:
  - Rehearsal
  - Organizing information
- Young children typically do not use rehearsal & organization.
- Children as young as 2 can learn to use other types of strategies to process information (modeling).

Language Development

- Young children’s understanding sometimes gets ahead of their speech.
- Many of the oddities of young children’s language sound like mistakes to adult listeners, but from the children’s perspective, they are not.
- As children go through early childhood, their grasp of the rules of language increases (morphology, semantics, pragmatics).
Morphology
- As children move beyond two-word utterances, they know morphology rules.
- They begin using plurals & possessive forms of nouns.
- They put appropriate endings on verbs.
- Prepositions, articles, & forms of the verb to be are used.
- They demonstrate knowledge of morphological rules (plural nouns, 3rd person singular, past tense etc.).

Semantics
- As children move beyond the two-word stage, their knowledge of meanings rapidly advances.
- The speaking vocabulary of a 6-yr-old ranges from 8,000 to 14,000 words.
- According to some estimates, the average child of this age is learning about 22 words a day!

Pragmatics
- Ninio & Snow (1966) identified understanding pragmatics (the rules of language) as a dramatic difference between 2-yr-old & a 6-yr-old’s use of language.
- At about 3 years of age, children improve their ability to talk about things that are not physically present—referred to as “displacement.”
Pragmatics

- Displacement is revealed in games of pretend.
- Large individual differences are seen in preschoolers’ talk about imaginary people & things.