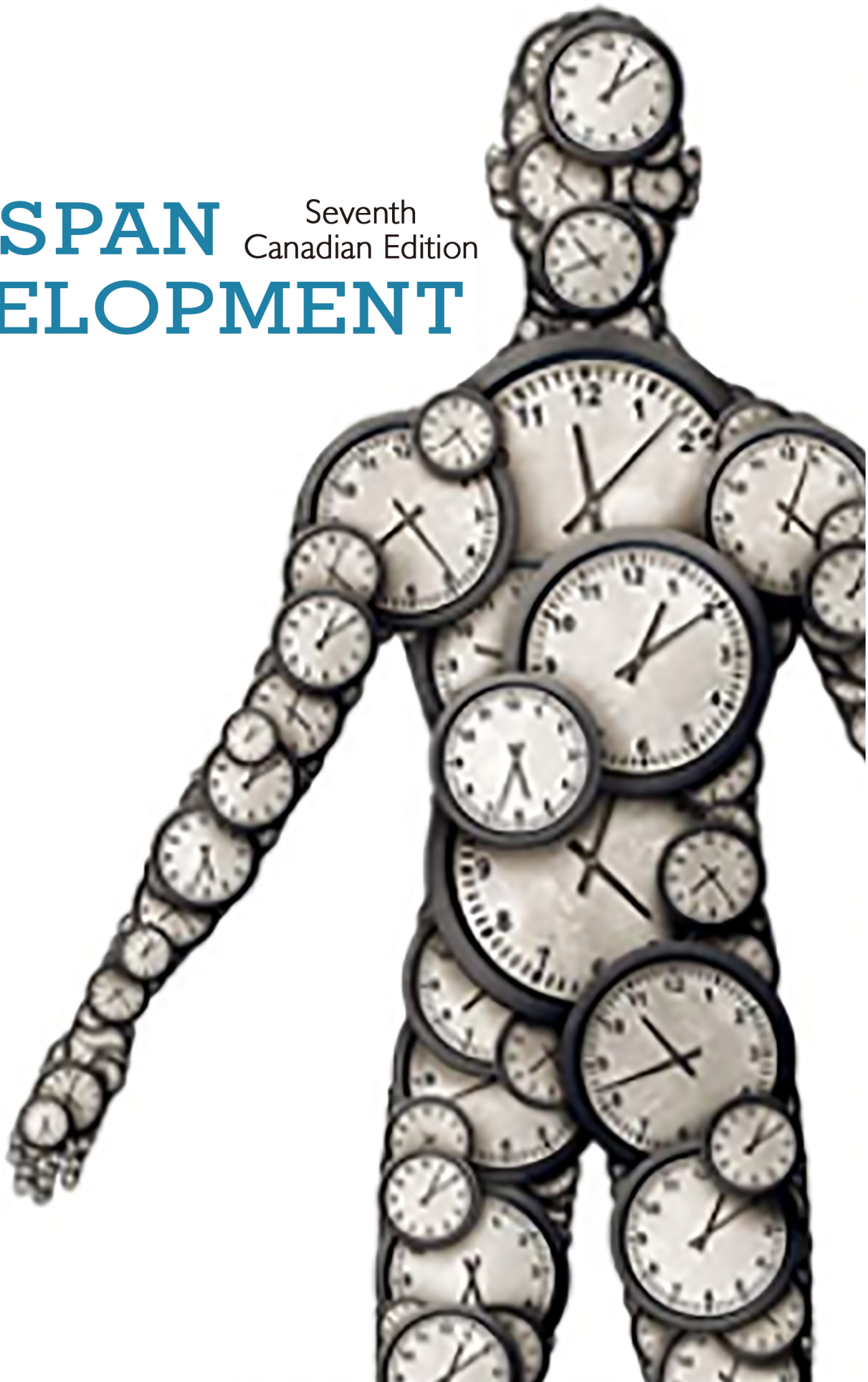


LIFESPAN Seventh Canadian Edition DEVELOPMENT

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About This Course

Welcome to the seventh Canadian edition of *Lifespan Development*. Since the first edition was released in 2002, we have seen some fairly dramatic shifts both in Canadian demographics and in the developmental sciences. For one, our population is aging. As well, our young adults are increasingly well educated and culturally diverse. They are also more likely to be single or living in common-law relationships than prior generations, and of those who are having children, most are having fewer. On the scientific front, current research is yielding a clearer understanding of the importance of prenatal and early childhood experiences on later development and, at the other end of the lifespan, new insights into the intricacies of the aging process, longevity, and intergenerational effects.

An important goal of the seventh edition is to provide an essential balance among theory, research, and practical application while making the study of human development relevant for those in the various fields in which this information is needed, including the social and health sciences, education, and many others. The very latest thinking and the most recent research is presented in as personal and direct a way as possible so that the book is more like a conversation than a traditional text, without sacrificing either theoretical clarity or rigour of research. To convey this richness, *Lifespan Development* includes teaching and learning features to help you manage and sort out all this information in an engaging and meaningful manner.

Acknowledgments

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Paul Johnson

Content Highlights

The seventh Canadian edition of *Lifespan Development* has been thoroughly revised and updated with well over 800 references infused into every possible content area of the textbook to reflect the latest research in the field of human development. Notably, one of the recognized strengths of this textbook continues to be its breadth of current Canadian content that is presented in standard Canadian English and includes metric conversions. To provide you with a brief overview, we offer some chapter-by-chapter highlights:

Chapter 1: Basic Concepts and Methods

Updated – Canadian Code of Ethics for Psychologists (4th ed.) based research ethics

Chapter 2: Theories of Development

New – transgenerational impacts of colonization on Indigenous peoples in Canada

Updated – early life interventions from an evolutionary perspective

Chapter 3: Prenatal Development and Birth

New – concerns over emerging insect-borne diseases, such as the *Zika* virus

New – explaining phenotypic differences in identical twins

New – Indigenous women’s exposure to teratogens and nutritional challenges during pregnancy

New – effects of cannabis use during pregnancy

New – Genetic Non-Discrimination Act (GNA) protection for genetic test results in Canada

New – reducing low birth rates through unconditional prenatal income for lowest income women

Updated – assisted human reproduction (AHR) regulations in Canada

Updated – genetic, environmental, epigenetic, and intrauterine influences on phenotypic differences during prenatal development

Updated – prenatal learning and behaviour

Updated – impact of lifestyle of fathers-to-be on future generations

Updated – concerns over the use of drugs during labour and delivery

Chapter 4: Physical, Sensory and Perceptual Development in Infancy

New – baby connectome research on the structural and functional development of the human brain throughout infancy

New – infant nutrition recommendations based on Canada’s new food guidelines

New – benefits of breastfeeding and the role of microbiota in the gut-brain network

Updated – research on infant colic

Updated – infant mortality issues including Indigenous infant risk

Updated – reciprocal eye gaze as an early sign of social communication

Chapter 5: Cognitive Development in Infancy

New – concerns over language development in Indigenous children

New – challenges in measuring Indigenous children’s language development

Chapter 6: Social and Personality Development in Infancy

New – the role of emotional and tactile responsiveness on attachment

New – intergenerational continuity and change in attachment patterns, with a special focus on Indigenous Canadians

New – early moral development

Updated – the father’s role in development of infant attachment and child rearing

Updated – caregiver mental health concerns

Updated – the role of genetics and epigenetics in temperament development

Updated – government support for new parents, including Indigenous families

Chapter 7: Physical and Cognitive Development in Early Childhood

New – early long-term memories in children

New – the role of taste receptors in food preferences and dietary habits

New – children’s food consumption and weight gain patterns

New – trends and concerns over children’s activity levels, including Indigenous children

New – Adverse Childhood Experiences (ACEs) patterns and risk factors in Canada, with a special focus on Indigenous intergenerational transmission of ACEs

New – concerns over cultural biases associated with Indigenous children’s IQ test results

Updated – unintentional injuries in Canadian preschoolers

Updated – Aboriginal Head Start programs

Chapter 8: Social and Personality Development in Early Childhood

New – the role of cultural context in Indigenous parenting styles

New – the impact of physical punishment on school readiness

Updated – Canadian family structures, including Indigenous families

Updated – the role of genetics in the intergenerational pattern of divorce

Updated – effects of childhood poverty in Canada

Chapter 9: Physical and Cognitive Development in Middle Childhood

New – concerns over IQ testing in schools for minority and Indigenous children

New – functional connectome similarities between a parent and child who share day-to-day emotional experiences

New – ADHD in boys and Indigenous children worldwide

Updated – healthy body and weight trends in Canadian children

Updated – effects of video games on children’s development

Updated – heritage language development in Indigenous children

Updated – ADHD and sleep problems

Chapter 10: Social and Personality Development in Middle Childhood

New – the Big-Five personality traits linked to four personality types

New – the role of spirituality and feelings of gratitude on children’s (including Indigenous children’s) well-being

Updated – how children compensate during Erikson’s industry vs. inferiority stage of development

Updated – concerns over witnessing bullying and defending victims, sibling bullying, and cyberbullying

Updated – neglected children and social status

Updated – modelling gun use viewed in movies

Chapter 11: Physical and Cognitive Development in Adolescence

New – sexual development in girls with a focus on historical & cultural views of menstruation including Indigenous *Moon Time*

New – approaching the “final” height in humans

New – Canadian 24-hour movement guidelines

New – concerns over vaping e-cigarettes

New – early school leavers including, Indigenous student trends

Updated – adolescent sexuality, including Indigenous women, fertility rates, and motherhood

Updated – patterns in sexual minority youth

Updated – trends in drug, alcohol, and tobacco use in Canada

Updated – depression and suicide concerns

Chapter 12: Social and Personality Development in Adolescence

New – causes and consequences of *adulthood*

New – cultural identity configurations, adaptability, and well-being

New – the role of social change on multicultural identity formation

Updated – self-concept development in context of family relations

Updated – gender role and stress in girls

Updated – Indigenous youth justice initiatives

Updated – the importance of attachment bonds with parent/caregivers, including the value for Indigenous youth

Chapter 13: Physical and Cognitive Development in Early Adulthood

New – effects of brain, gut, and microbiota interactions on brain, endocrine, and immune functioning

New – STI issues and opportunities among Indigenous young adults

New – socioeconomic factors in Indigenous and immigrant health inequalities and inequities

New – the role of *diet composition* for health

Updated – the role of enhanced cognitive training and physical fitness on the brain and nervous system

Updated – intimate partner violence prevalence and contributing factors, with a focus on Indigenous women

Updated – sexual assault trends in Canada

Updated – factors associated with mental disorders in young adulthood

Updated – alcohol consumption risks

Updated – post-secondary education field of study and earnings trends in Canada, including Indigenous graduation trends

Chapter 14: Social and Personality Development in Early Adulthood

New – similar neural responding among close friends predicts attachment quality

New – single people’s attachment orientation and impact on well-being

New – objective measures of Canadians’ work satisfaction portrayed by six job quality indicators

Updated – psychological aspects of marriage and parenthood

Updated – gender differences in occupational fields, wages, and work patterns in Canada

Chapter 15: Physical and Cognitive Development in Middle Adulthood

New – how microbiome and interstitium research is changing medicine

Updated – osteoporosis risk factors

Updated – cancer and cardiovascular disease risk factors

Chapter 16: Social and Personality Development in Middle Adulthood

New – Erikson’s generativity in the workplace and in grandparenting from an Indigenous perspective

New – Vaillant’s research on the effect of childhood experiences on generativity in adulthood

Updated – adult children living with their middle-aged parents in Canada

Updated – odds of becoming a grandparent in Canada

Updated – neural connectivity and personality continuity over the lifespan

Updated – work satisfaction, work performance, and retirement planning in middle-aged Canadians

Updated – Canada’s historical role and current position on stem cell research

Chapter 17: Physical and Cognitive Development in Late Adulthood

New – using the *epigenetic clock* to measure aging

New – Human Connectome Project study of the aging brain and nervous system in late adulthood

Updated – the life expectancy and longevity of Canadians

Updated – health habits of older Canadians

Updated – effects of hearing loss and tinnitus

Updated – sleeping patterns of older Canadians

Updated – long-term care needs including older Indigenous Canadians

Updated – new *biomarkers* and risks for Alzheimer’s disease

Updated – memory change from a “SuperAgers” perspective

Chapter 18: Social and Personality Development in Late Adulthood

New – social engagement and social isolation among older Canadians

Updated – benefits of family relationships, including benefits for Indigenous seniors

Updated – successful aging among Canadians

Updated – life satisfaction ratings among older Canadians

Updated – critique of the successful aging paradigm in oldest old

Updated – elder abuse risk in Canada

Updated – living arrangements and the benefits of being married

Updated – the timing and effects of retirement

Chapter 19: Death, Dying and Bereavement

New – the role of spiritual beliefs and a sense of personal worth in facing death, including Indigenous perceptions and roles

New – changes in personality predict terminal decline

New – identifying and treating prolonged grief

Updated – issues and benefits of hospice palliative care in Canada, including access challenges for Indigenous peoples

Updated – medical assistance in dying (MAID) rates since 2016 and some remaining issues

Chapter 1

Basic Concepts and Methods



(Photo: Wayne R Bilenduke/The Image Bank/Getty Images)

✓ Learning Objectives

THE SCIENTIFIC STUDY OF HUMAN DEVELOPMENT

- 1.1 Explain each of the philosophies that are important to the study of human development.
- 1.2 Describe the contributions of the early developmental scientists.
- 1.3 Describe the contributions made by Canadian developmental psychologists during the field's formative years.

CONTEMPORARY HUMAN DEVELOPMENT

- 1.4 Explain the importance of the lifespan perspective.
- 1.5 List and describe the three major domains of development.
- 1.6 Explain developmental changes in terms of continuity and discontinuity.
- 1.7 Describe the interactionist model of development.

RESEARCH METHODS AND DESIGNS

- 1.8** List and describe the research goals of scientists who study human development.
- 1.9** State the advantages and disadvantages of the research methods used in identifying relationships among variables.
- 1.10** Describe how cross-sectional, longitudinal, and sequential research designs differ.
- 1.11** Describe the importance of cross-cultural research to the study of human development.
- 1.12** Identify five ethical standards that developmental researchers must follow.

The last time you saw a relative or friend whom you hadn't seen for a while, perhaps you remarked on how much or how little the person had changed. About a child, you may have said, "Nella's grown so much since the last time I saw her." About an older person, "Uncle Orland looks much frailer than he did at Grandpa's birthday party." Such comments suggest that we humans are natural observers of the ways in which we change with age. But we also notice characteristics that seem to stay the same over time. We might say, "Nella's always been such a sweet child," or "Uncle Orland's mind is as sharp as ever." And our powers of observation don't stop with simple descriptions. We also come up with theories to explain our observations. Perhaps you've said something like, "Nella's parents are great role models. That's probably why she's so well behaved," or "Grandpa and Uncle Orland are both pretty sharp for their age. I guess they have good genes." As these observations suggest, human development is a complex phenomenon. To understand it, we developmentalists must examine many variables and the relations among them.

In this introductory chapter, you will learn how the science of human development came into being. You will also learn about the key issues in the scientific study of development. When you finish reading the chapter, you will be acquainted with the research designs and methods used by developmentalists.

The Scientific Study of Human Development

human development
the scientific study of age-related changes in our bodies, behaviour, thinking, emotions, social relationships, and personalities

The field of **human development** is the scientific study of age-related changes in our bodies, behaviour, thinking, emotions, social relationships, and personalities. Long before the scientific method was used to study development, though, philosophers offered a variety of explanations for differences they observed in individuals of different ages. Their ideas continue to influence the field today, and many current beliefs about human development are based on them.

Learning Objective 1.1

Explain each of the philosophies that are important to the study of human development.

Philosophical Roots

Early philosophers based their ideas about development on spiritual authorities, general philosophical orientations, and deductive logic. Typically, philosophers' inquiries into the nature of development focused on why babies, who appear to be quite similar, grow up to vary widely. (See **Table 1.1**.)

Table 1.1 Philosophical Approaches to Development

Historical Philosophical Perspective	Child's Inherent Predisposition	Parental Responsibility
Original Sin	Sinful	Intervene to correct
The Blank Slate	Neutral	Shape behaviours
Innate Goodness	Good	Nurture and protect

ORIGINAL SIN For centuries, the Christian doctrine of *original sin*, often attributed to the 4th-century North African philosopher Augustine of Hippo, taught that all humans are born with a selfish and stubborn nature. To reduce the influence of this inborn tendency toward sinfulness, Augustine taught, humans must seek redemption by leading a disciplined life. Thus, from this perspective, parents facilitate the child's struggle to overcome an inborn tendency to act immorally by restraining and correcting the child's immoral tendencies.

THE BLANK SLATE By contrast, the 17th-century English philosopher John Locke drew on a broad philosophical approach known as *empiricism* when he claimed that the mind of a child is a *blank slate*. Empiricism is the view that humans possess no innate tendencies and that all differences among humans are attributable to experience. As such, the blank slate view suggests that adults can mould children into whatever they want them to be. Therefore, differences among adults can be explained in terms of the differences in their childhood environments rather than as a result of a struggle to overcome their inborn tendencies, as the original sin view proposed.

INNATE GOODNESS Different still was the *innate goodness* view proposed by the 18th-century Swiss philosopher Jean-Jacques Rousseau. He claimed that all human beings are naturally good and seek out experiences that help them grow (Newman & Newman, 2016). Rousseau believed that children need only nurturing and protection to reach their full potential. Good developmental outcomes happen when a child's environment refrains from interfering in her attempts to nurture her own development. In contrast, poor outcomes occur when a child experiences frustration in her efforts to express the innate goodness with which she was born.

The Study of Human Development Becomes a Science

The 19th century saw an explosion of interest in how scientific methods might be applied to questions that previously had been thought to belong within the domain of philosophy. In particular, by 1930, the field of psychology played a major role in establishing the foundations of modern human development and had begun to influence everyday child-rearing practices. (See **Development in the Real World**.)

DARWIN Charles Darwin and other evolutionists believed they could understand the development of the human species by studying child development. Many, including Darwin, kept detailed records of their own children's early development (called *baby biographies*) in the hope of finding evidence to support the theory of evolution (Charlesworth, 1992; Dewsbury, 2009). These were the first organized studies of human development.

Darwin's theory of evolution is the source of many important ideas in modern human development. For example, the concept of developmental stages comes from evolutionary theory. However, critics of baby biographies claimed that studying children for the purpose of proving a theory might cause observers to misinterpret or ignore important information.

Critical Thinking

Other cultures and religions have different ways of viewing the process of development. How do the original sin, blank slate, and innate goodness views compare with your own beliefs? How do you think your own culture and religion have contributed to these beliefs?

Learning Objective 1.2

Describe the contributions of the early developmental scientists.

Development in the Real World

Toys: More Than Just Playthings

Today, a vital element of children's development is centred on playing with toys: "If play is the child's work, then toys are the child's tools" (Cuffaro et al., 2013, p. 138), and appropriately designed tools can help the child do their work well. Accordingly, it is important to design toys that promote the development of the child (Auerback, 2014). With this in mind, toy designers now create many toys to promote children's

- *physical development*—improve muscle control and strength, and eye-hand coordination
- *cognitive development*—strengthen language and numeracy development; foster imagination and reasoning ability through creative expression and problem-solving
- *emotional development*—act out inner thoughts, feelings, and fantasies in a safe manner; learn persistence and mastery
- *social development*—learn to share and cooperate with others; practise social-cultural values and rules through make-believe

The Developmental Science Behind Toys

In Canada, an important factor to consider in the design of toys is whether a toy is *age-appropriate*, which means a toy not only matches a child's capabilities but also captures a child's interest. "No matter how promising, if a toy is not fun, it will gather dust" (Canadian Toy Testing Council, [CTTC], n.d.). While toy-testing research helps to identify what parents and children want in toys, it also considers safety, performance, appeal, usefulness, durability, age-appropriateness, and potential improvements.

At each stage of development a child faces new challenges and different risks (Canadian Child Care Federation [CCCF], 2018). The Canadian and international toy industries have developed age-appropriate recommendations so that toys challenge and stimulate based on a child's chronological age as well as physical size, skill level, temperament, and maturity (The Toy Association, n.d.). Toys that are beneath or beyond a child's capabilities may discourage the child from developing further interests.

The research that goes into toy design and manufacture is represented by the information contained on toy product labels. The label provides important guidelines for parents when making toy selections (Health Canada, 2018). For instance, babies tend to put things into their mouths and are therefore at high risk for choking on small toys or toy parts; riding toys for toddlers pose a risk because children at this age do not have well-developed coordination, and this can result in a child running into objects or falling down stairs; and projectile toys, although appealing to young children, can cause a variety of injuries, especially eye injuries (CCCF, 2018). As a result, toys are labelled with suitable age ranges—for example, "recommended for children from 18 months to 3 years." In many instances, toy labels may also carry a safety warning—for example, "Choking hazard: This toy contains small parts and is not intended for children under the age of 3." At any age, parental supervision is important, and toys meant for older children should be kept away from smaller children (CCCF, 2018).



(Photo: James Shaffer/PhotoEdit, Inc.)

LEGO means "play well." The "automatic building brick," invented by a Danish carpenter in 1949, can be considered an ideal toy in that it fosters development in the four key areas of growth: physical, cognitive, emotional, and social (Froberg Mortensen, 2017; Pisani, 2006; Toy Retailers Association, n.d.).

norms

average ages at which developmental milestones are reached

HALL G. Stanley Hall of Clark University wanted to find more objective ways to study development. He used questionnaires and interviews to study large numbers of children. His 1891 article titled "The Contents of Children's Minds on Entering School" represented the first scientific study of child development (White, 1992). Hall agreed with Darwin that the milestones of childhood were similar to those that had taken place in the development of the human species. He thought that developmentalists should identify **norms**, or average ages, at which developmental milestones are

reached. Norms, Hall said, could be used to learn about the evolution of the species as well as to track the development of individual children.

GESELL Arnold Gesell's research suggested the existence of a genetically programmed sequential pattern of change (Gesell, 1925; Thelen & Adolph, 1992). Gesell used the term **maturation** to describe such a pattern of change. He thought that maturationally determined development occurred regardless of practice, training, or effort (Newman & Newman, 2016). For example, infants don't have to be taught how to walk—they begin to do so on their own once they reach a certain age. Because of his strong belief that maturation determines many important developmental changes, Gesell spent decades studying children and developing norms. He pioneered the use of movie cameras and one-way observation devices to study children's behaviour. His findings became the basis for many **norm-referenced tests** that are used today to determine whether individual children are developing at a rate that is similar to that of other children of the same age. Such tests help early educators find ways of helping young children whose development differs significantly from that of their peers.

PIAGET One of the most influential theories in the history of human development is that of Swiss developmentalist Jean Piaget (Thomas, 2005). At the age of 10, Piaget published his first scientific article, on sparrows. By the time he was 21, he had published more than 20 scientific articles and had received a Ph.D. in natural science from the University of Geneva. In 1918, he went to Paris to work with Theodore Simon, the co-author of the Binet-Simon IQ test, at the school that Alfred Binet started. Piaget married his colleague and student Valentine Châtenay in 1923, and two years later Châtenay gave birth to their first child, Jacqueline. Piaget and Châtenay made detailed notes about Jacqueline's and their two other children's intellectual and language development.

Piaget became a professor at the University of Geneva in 1921 and spent the next six decades studying the development of logical thinking in children, until his death in 1980. His studies convinced him that logical thinking develops in four stages between birth and adolescence. At first, infants explore the world by using their senses and motor abilities. Through their actions, they develop basic concepts of time and space. Next, young children develop the ability to use symbols (primarily words) to think and communicate. Once they become proficient in the use of symbols, around age 6 or 7, children are ready to develop the skills needed for logical thinking. They spend the next five to six years using these skills to solve problems in the everyday world. Finally, in the teenage years, individuals develop the capacity to apply logic to both abstract and hypothetical problems.

The stages Piaget described and the theory he proposed to explain them became the foundation of modern cognitive-developmental psychology. Consequently, you will be reading a great deal more about them in later chapters.

A Brief History of the Roots of Developmental Psychology in Canada

The first psychology course in Canada was taught at Dalhousie University in 1838. Later, in the 1850s, prescientific psychology courses were offered at McGill University in Montreal and the University of Toronto. In these early years, psychology was not considered a distinct discipline but rather a branch of mental and moral philosophy (Wright & Myers, 1982, p. 86). It wasn't until 1889 that modern scientific psychology came to Canada. James M. Baldwin began lecturing in the fall of that year at the University of Toronto and set up a small psychophysical laboratory (Hoff, 1992).

maturation

the gradual unfolding of a genetically programmed sequential pattern of change

norm-referenced tests

standardized tests that compare an individual's score to the average score of same-aged peers

Learning Objective 1.3

Describe the contributions made by Canadian developmental psychologists during the field's formative years.

In the 1920s, funding became available for child-related and family research, and in 1925 William Blatz opened the St. George's School for Child Study in Toronto. Blatz is regarded as "the founder and leader of child study in Canada" (Wright & Myers, 1982, p. 86). St. George's was later renamed the Institute of Child Study and is now incorporated into the Ontario Institute for Studies in Education (OISE). Blatz is also known for his three years of work with the Dionne quintuplets, beginning in 1935.

Prior to World War II, there was no formal organization of practising psychologists in Canada. The impetus for creating a psychological organization came from the threat of war in Europe. In June 1938, psychologists were deliberating how they could provide their services for the war effort. From these discussions, E.A. Bott of the University of Toronto, George Humphrey of Queen's University, and Roy Liddy of the University of Western Ontario founded the Canadian Psychological Association (CPA) in 1939. Also present during these early discussions were Mary Wright and Mary Salter (later Ainsworth). Mary Wright (1915–2014), an associate of Mary Salter Ainsworth, became the first woman president of the CPA in 1969 (Wright, 1993). Mary Salter Ainsworth (1913–1999), whose work on infant attachment you will encounter in the chapter Social and Personality Development in Infancy, established the theoretical and empirical framework through which developmentalists continue to view infant–caregiver relations.

Canadian psychologists were very active during World War II, especially in Britain, where they focused on personnel selection, recruitment and training methods, morale issues, and all aspects of public opinion. Important strides in early education came about at that time because of the major evacuation of children in Britain away from urban centres. Canadian psychologists were empowered to generate solutions to the ensuing child-care problems. William Blatz was called on to establish a nursery school teachers' training school in Birmingham (Ferguson, 1993). The school was staffed by Canadian child psychologists.

In 1981, the Developmental Section of the CPA was established. Its goal is to facilitate communication among developmental psychologists in terms of research, teaching, and practice. At present, the Developmental Section provides a forum for collaboration and the sharing of expertise for hundreds of members. It has recently added the Elinor Ames Award for the best student presentation in the Developmental Section at the annual CPA convention.



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In the early days of psychology, female psychologists seldom received credit for their accomplishments because of societal attitudes toward women. Mary Salter Ainsworth was one of the earliest female psychologists to be recognized in Canada; she was part of a group of psychologists actively involved in the creation of the Canadian Psychological Association.

Test Yourself before going on

- Write the name of the philosopher who is associated with each view of development.
 - original sin _____
 - blank slate _____
 - innate goodness _____
- What did each of these early researchers do?
 - Charles Darwin _____
 - G. Stanley Hall _____
 - Arnold Gesell _____
- Early in Canada, the discipline of psychology was originally studied as a branch of _____ and _____.

Critical Thinking

- What are the child-rearing implications of the original sin, blank slate, and innate goodness views of development?

Contemporary Human Development

The study of human development has changed considerably since the early days. For one thing, the term *development* now encompasses the entire human lifespan rather than just childhood and adolescence. For another, developmentalists have come to understand that inborn characteristics interact with environmental factors in complex ways. Finally, the pioneers thought of change almost exclusively in terms of norms, whereas today's developmentalists view norms as representing only one way to measure change.

The Lifespan Perspective

Developmentalists once thought of adulthood as a long period of stability followed by a short span of unstable years immediately preceding death. This view has changed because, for one thing, it has become common for adults to go through major life changes, such as divorce and career shifts. There has also been a significant increase in life expectancy in the developed countries of the world. The life expectancy of a Canadian born in 1921 was 59 years for a male and 61 years for a female; a Canadian male born today can expect to live beyond age 80 and a female past 84 (Statistics Canada, 2018a; World Health Organization [WHO], 2018). As a result, older adults now constitute a larger proportion of the population than ever before. In fact, adults over the age of 100 are one of the most rapidly growing age groups in Canada, and their numbers are expected to increase fivefold by mid-century to 40 000 (Statistics Canada, 2018b).

The changes outlined above have led to the adoption of a **lifespan perspective**, the idea that important changes occur during every period of development and that these changes must be interpreted in terms of the culture and context in which they occur (Baltes, Lindenberger, & Staudinger, 2006; Baltes, Reese, & Lipsitt, 1980). Thus, understanding change in adulthood has become just as important as understanding change in childhood, and input from many disciplines is necessary to fully explain human development.

Paul Baltes (1939–2006) of the Max Planck Institute in Germany was one of the early leaders in the development of a comprehensive theory of lifespan human development (Lerner, 2008). Baltes proposed that the capacity for positive change, or *plasticity*, in response to environmental demands is possible throughout the entire lifespan. One such area of positive adult development is the area of personal goals—older adults pursue their goals more intensely than younger adults (Riediger, Freund, & Baltes, 2005). Consequently, one of Baltes's most important contributions to the study of human development was his emphasis on the positive aspects of advanced age. He emphasized that, as human beings age, they adopt strategies that help them maximize gains and compensate for losses. For instance, one of Baltes's most often quoted examples is that of concert pianist Arthur Rubinstein, who was able to outperform much younger musicians well into his 80s (Cavanaugh & Whitbourne, 1999). Rubinstein reported that he maintained his performance capacity by carefully choosing pieces that he knew very well (maximizing gain) and by practising these pieces more frequently than he had at earlier ages (compensating for the physical losses associated with age). You will read more about Baltes's theories and his research later, in the chapters devoted to late adulthood.

The Domains of Development

Scientists who study age-related changes across the lifespan often use three broad categories, called *domains of development*, to classify these changes. The **physical domain** includes changes in the size, shape, and characteristics of the body. For example, developmentalists study the physiological processes associated with puberty. Also included in this domain are changes in how individuals sense and perceive the physical world, such as the gradual development of depth perception over the first year of life.

Learning Objective 1.4

Explain the importance of the lifespan perspective.

lifespan perspective

the current view of developmentalists that changes happen throughout the entire human lifespan and that changes must be interpreted in light of the culture and context in which they occur; thus, interdisciplinary research is critical to understanding human development

plasticity

the ability of the brain to change in response to experience

Learning Objective 1.5

List and describe the three major domains of development.

physical domain

changes in the size, shape, and characteristics of the body

cognitive domain

changes in thinking, memory, problem-solving, and other intellectual skills

social domain

changes in variables that are associated with the relationship of an individual to others

Changes in thinking, memory, problem-solving, and other intellectual skills are included in the **cognitive domain**. Researchers working in the cognitive domain study topics as diverse as how children learn to read and why some memory functions deteriorate in old age. They also examine the ways in which individual differences among children and adults, such as intelligence test scores, are related to other variables within this domain.

The **social domain** includes changes in variables that are associated with the relationship of an individual to others. For instance, studies of children's social skills fall into the social domain, as does research on individual differences in personality. Individuals' beliefs about themselves are also usually classified within the social domain.

Using domain classifications helps to organize discussions of human development. We need to remember, however, that the three domains do not function independently. For instance, when a girl goes through puberty, a change in the physical domain, her ability to think abstractly (cognitive domain), and her feelings about potential romantic partners (social domain) change as well. Likewise, older adults who suffer from Alzheimer's disease demonstrate obvious changes in the cognitive domain. But these changes both result from and lead to others in the remaining two domains. Physical changes in the brain are the most likely cause of Alzheimer's disease. The experience of living with the disease may cause a sufferer to be unable to maintain a regular eating and exercise schedule, thus leading to deterioration in physical health. Moreover, individuals who have such severe memory impairments often forget important things about the people with whom they associate, such as their names and relationships. As a result, social relationships are disrupted or may even be impossible.

Learning Objective 1.6

Explain developmental changes in terms of continuity and discontinuity.

Continuity and Discontinuity in Development

Another key issue in the study of human development is the *continuity–discontinuity* issue. The question is whether age-related change is primarily a matter of amount or degree (the *continuity* side of the debate) or of changes in type or kind (the *discontinuity* side). For example, generally speaking, do you have more or fewer friends than you did when you were in elementary school? If you're like most other people, you have fewer. But do age differences in the number of friends people have really capture the difference between friendship in childhood and adulthood? Isn't it also true that friendship itself is different in childhood and adulthood? For example, mutual trust is a characteristic of adult and teen friendships but is not a feature of friendship prior to age 10 or so. Thus, the continuous aspect of friendship is that people of all ages have peer relationships, and the discontinuous aspect of friendship is that the characteristics of friendship itself vary by age.

Another way of approaching the continuity–discontinuity question is to think of it in terms of *quantitative* and *qualitative* change. A **quantitative change** is a change in amount. For instance, children get taller as they get older. Their heights increase, but the variable of height itself never changes. In other words, height changes continuously; it has continuity from one age to the next. Alternatively, a **qualitative change** is a change in characteristic, kind, or type. For example, puberty is a qualitative change. Prior to puberty, humans are incapable of reproduction. After puberty, they can reproduce. Therefore, postpubescent humans possess a characteristic that prepubescent humans do not: the capacity to reproduce. In other words, postpubescent and prepubescent humans are qualitatively different, and changes in the capacity to reproduce are discontinuous in nature. Later in life, another qualitative change in reproductive capacity occurs when women go through menopause and lose the capacity for reproduction.

quantitative change

a change in amount

qualitative change

a change in characteristic, kind, or type

stages

qualitatively distinct periods of development

Of particular significance is the idea that, if development consists only of additions (continuous, quantitative change), then the concept of **stages**, qualitatively distinct periods of development, is not needed to explain it. However, if

development involves reorganization or the emergence of wholly new strategies, qualities, or skills (discontinuous, qualitative change), then the concept of stages may be useful. As you'll learn in the chapter Theories of Development, one of the important differences among theories of development is whether they assume that development occurs in stages or is primarily continuous in nature. Nevertheless, most human development theorists and researchers would agree that age-related changes can be classified by using three categories: *universal changes*, *group-specific changes*, and *individual differences*.

UNIVERSAL CHANGES *Universal changes* are common to every individual in a species and are linked to specific ages. Some universal changes happen because we are all biological organisms subject to a genetically programmed maturing process. The infant who shifts from crawling to walking and the older adult whose skin becomes progressively more wrinkled are following a plan that is an intrinsic part of the physical body, most likely something in the genetic code itself.

However, some changes are universal because of shared experiences. A *social clock* also shapes all (or most) lives into shared patterns of change (Helson, Mitchell, & Moane, 1984). In each culture, the **social clock**, or a set of *age norms*, defines a sequence of normal life experiences, such as the right time to start school, the appropriate timing of marriage and child-bearing, and the expected time of retirement.

Age norms can lead to **ageism**—a prejudicial attitude toward older adults, analogous to sexism or racism. In Canadian society, for example, conventional wisdom states that job performance will decline in older adults. As a result, many older adults are denied opportunities to work because employers believe that they are less capable of carrying out required job functions than younger adults. Thus, social expectations about the appropriate age for retirement work together with ageism to shape individual lives, resulting in a pattern in which most people retire or significantly reduce their working hours in later adulthood.

GROUP-SPECIFIC CHANGES *Group-specific changes* are shared by all individuals who grow up together in a particular group. One of the most important groups to which we all belong is our culture (Iverson, Larsen, & Solem, 2009). The term *culture* has no commonly agreed-on definition, but in essence it describes some system of meanings and customs, including values, attitudes, goals, laws, beliefs, moral guidelines, and physical artifacts of various kinds, such as tools, forms of dwellings, and the like. Culture shapes not only the development of individuals but also our ideas about what normal development is.

social clock

a set of age norms that defines a sequence of life experiences that is considered normal in a given culture and that all individuals in that culture are expected to follow

ageism

a prejudicial view of older adults that characterizes them in negative ways



(Photos: left, Tom Wang/Fotolia; right, WONG SZE FEI/Fotolia)

The biological clock obviously constrains the social clock to some extent at least. Virtually every culture emphasizes family formation in early adulthood because that is, in fact, the optimal biological time for child-bearing.

cohort

a group of individuals who share the same historical experiences at the same times in their lives

critical period

a specific period in development when an organism is especially sensitive to the presence (or absence) of some particular kind of experience

Critical Thinking

From birth onward your cohort has encountered and will continue to encounter the same social events, moods, and trends at similar ages. What momentous historical events and shifts in society-wide attitudes and trends make your cohort group truly unique? How does your cohort react toward families, sex roles, marriage, careers, religion, social justice, and personal responsibility?

sensitive period

a span of months or years during which a child may be particularly responsive to specific forms of experience or particularly influenced by their absence

atypical development

development that deviates from the typical developmental pathway

Learning Objective 1.7

Describe the interactionist model of development.

For example, researchers interested in middle and late adulthood often study retirement: why people retire, how retirement affects their health, and so on. But their findings do not apply to older adults in developing nations, where adults gradually shift from one kind of work to another as they get older rather than giving up work altogether and entering a new phase of life called *retirement*. Consequently, developmentalists must be aware that retirement-related phenomena do not constitute universal changes. Instead, they represent developmental experiences that are culturally specific.

Equally important as a source of variation in life experience are historical forces, which affect each generation somewhat differently. Social scientists use the word **cohort** to describe a group of individuals who are born within some fairly narrow span of years and thus share the same historical experiences at the same time in their lives. Within any given culture, successive cohorts may have quite different life experiences.

INDIVIDUAL DIFFERENCES *Individual differences* are changes resulting from unique, unshared events. One clearly unshared event in each person's life is conception; the combination of genes each individual receives at conception is unique. Thus, genetic differences—including physical characteristics, such as body type and hair colour, as well as genetic disorders—represent one category of individual differences. Characteristics influenced by both heredity and environment, such as intelligence and personality, constitute another class of individual differences.

Other individual differences are the result of the timing of a developmental event. Child development theorists have adopted the concept of a **critical period**. The idea is that there may be specific periods in development when an organism is especially sensitive to the presence (or absence) of some particular kind of experience.

Most knowledge about critical periods comes from animal research. For baby ducks, for instance, the first 15 hours or so after hatching is a critical period for the development of a following response. Newly hatched ducklings will follow any duck or any other moving object that happens to be around them at that critical time. If nothing is moving at that critical point, they don't develop any following response at all (Hess, 1972).

The broader concept of a sensitive period is more common in the study of human development. A **sensitive period** is a span of months or years during which a child may be particularly responsive to specific forms of experience or particularly influenced by their absence. For example, the period from 6 to 12 months of age may be a sensitive period for the formation of parent–infant attachment. The presence or absence of specific environmental factors during critical and sensitive periods early in life can produce changes, for better or worse, that last a lifetime (Tzschentke & Plagemann, 2006). This important concept will be further examined when we discuss *epigenetics* in later chapters.

In studies of adults, one important concept related to timing has been the idea of *on-time* and *off-time* events (Neugarten, 1979). The idea is that experiences occurring at the expected times for an individual's culture or cohort (on-time events) will pose fewer difficulties for her than will off-time experiences. Thus, being widowed at 30 is more likely to produce serious life disruption or forms of pathology, such as depression, than being widowed at 70.

Atypical development is another kind of individual change. **Atypical development** refers to deviation from a typical, or "normal," developmental pathway. Examples of atypical development include exceptionalities, developmental delay, psychological disorders, and behavioural problems, such as extreme aggressiveness in children and compulsive gambling in adults.

The Interactionist Model of Development

Some early developmentalists thought of change as resulting from *either* forces outside the person *or* forces inside the person. The debate about the relative contributions of biological processes and experiential factors was known as the *nature–nurture*

controversy. In struggling with this important issue, developmentalists have moved away from either/or toward more subtle ways of looking at both types of influences. Today, many theorists have adopted an **interactionist model** that considers development to be the result of complex reciprocal interactions between multiple personal and environmental factors.

A good example of research that exemplifies the interactionist model is implicit in the ideas of *vulnerability* and *resilience* (Willms, 2002a). According to this view, each child is born with certain vulnerabilities, such as a tendency toward emotional irritability or alcoholism, a physical abnormality, or an allergy. Each child is also born with some *protective factors*, such as high intelligence, good physical coordination, an easy temperament, or a lovely smile, that tend to make her more resilient in the face of stress. These vulnerabilities and protective factors then interact with the child's environment so that the same environment can have quite different effects, depending on the qualities the child brings to the interaction.

Studies of Canadian children have shown that a combination of a highly vulnerable child and a disadvantaged/unsupportive environment produces by far the most negative outcome (Klein, Kufeldt, & Rideout, 2006; Masten & Barnes, 2018; Willms, 2002b). Either of these two negative conditions alone—a vulnerable child or an adverse environment—can be overcome. A resilient child in a poor environment may do quite well, since she can find and take advantage of all the stimulation and opportunities available; similarly, a vulnerable child may do quite well in a highly supportive environment in which parents help the child overcome or cope with her vulnerabilities.

interactionist model

the theory that development results from complex reciprocal interactions between multiple personal and environmental factors

Test Yourself before going on

- The view that human development from conception to death should be studied from multiple disciplinary perspectives is known as the _____.
- Give an example from the text of development in each domain.
- Developmental stages are often a feature in the theories of developmentalists who emphasize _____ changes.
- Evidence of both continuity and discontinuity in development is based in _____ and _____ changes and individual differences resulting from the unique personal experiences.
- How does the interactionist theory of development explain the nature–nurture controversy?

Domain	Example
Physical	
Cognitive	
Social	

Critical Thinking

- How do your culture's behavioural expectations for 20-year-olds, 40-year-olds, and 60-year-olds differ?

Research Methods and Designs

The easiest way to understand research methods is to look at a specific question and the alternative ways we might answer it. For example, older adults frequently complain that they have more trouble remembering people's names than they did when they were younger. Suppose we wanted to find out whether memory really declines with age. How would we go about answering this question?

Relating Goals to Methods

Developmental researchers use the scientific method to achieve four goals: to *describe*, *explain*, *predict*, and *influence* human development from conception to death.

DESCRIBE To describe development is simply to state what happens. In attempting to describe human development, for example, we might make a descriptive statement

Learning Objective 1.8

List and describe the research goals of scientists who study human development.

such as “Older adults make more memory errors than young and middle-aged adults.” To test whether this statement meets its descriptive goal, we could simply measure memory function in adults of various ages.

EXPLAIN Explaining development involves telling why a particular event occurs. To generate explanations, developmentalists rely on *theories*—sets of statements that propose general principles of development. Students often say that they hate reading about theories; what they want are the facts. However, theories are important because they help us look at facts from different perspectives. For example, “Older adults make more memory mistakes because of changes in the brain that happen as people get older” is a statement that attempts to explain the fact of age-related memory decline from a biological perspective. Alternatively, we could explain memory decline from an experiential perspective and hypothesize that memory function declines with age because older adults don’t get as much memory practice as younger adults do.

PREDICT Useful theories produce predictions, or *hypotheses*, that researchers can test, such as “If changes in the brain cause declines in memory function, then elderly adults whose brains show the most change should also make the greatest number of memory errors.” To test this hypothesis about changes in the brain and memory, we would have to measure some aspects of brain structure or function as well as memory function. Then we would have to find a way to relate one to the other. Alternatively, we could test the experiential explanation by comparing the memories of older adults who presumably get the most memory practice, such as those who are still working, with the memories of those who get less practice. If the working adults do better on tests of memory, the experiential perspective gains support. It is in this way that theories add tremendous depth to researchers’ understanding of the facts of human development and provide them with information they can use to influence development.

INFLUENCE Let’s say, for example, that an older adult is diagnosed with a condition that can affect the brain, such as high blood pressure. If we know that brain function and memory are related, we can use tests of memory to make judgments about how much the person’s medical condition may have already influenced his brain. At the same time, because we know that experience affects memory as well, we may be able to provide him with training that will help prevent memory problems from developing or worsening.

Learning Objective 1.9

State the advantages and disadvantages of the research methods used in identifying relationships among variables.

case study

an in-depth examination of a single individual

Research Methods for Identifying Relationships Between Variables

A researcher interested in age and memory ability must decide how to go about finding relationships between *variables*. To developmentalists, variables are characteristics that vary from person to person, such as physical size, intelligence, and personality. When two or more variables vary together, there is some kind of relationship between them. The hypothesis that memory declines with age involves two variables, memory and age, and suggests a relationship between them. There are several ways of identifying such relationships.

DESCRIPTIVE METHODS **Case studies** are in-depth examinations of single individuals. To test the hypothesis about memory and age, we could use a case study comparing one individual’s scores on tests of memory in early and late adulthood. Such a study might tell us a great deal about the stability or instability of memory in the individual studied, but we wouldn’t know if our findings applied to others.

Still, case studies are extremely useful in making decisions about individuals. For example, to find out whether a child is intellectually delayed, a psychologist would

conduct an extensive case study involving tests, interviews of the child's parents, behavioural observations, and so on. Case studies are also frequently the basis of important hypotheses about unusual developmental events, such as head injuries and strokes.

When psychologists use **naturalistic observation** as a research method, they observe people in their normal environments. For instance, to find out more about memory in older adults, a researcher could observe them in their homes or workplaces. Such studies provide developmentalists with information about psychological processes in everyday contexts.

The weakness of naturalistic observation, however, is *observer bias*. For example, if the researcher who is observing older adults is convinced that most of them have poor memories, he is likely to ignore any behaviour that goes against this view. Because of observer bias, naturalistic observation studies often use “blind” observers who don't know what the research is about. In most cases, for the sake of accuracy, researchers use two or more observers so that the observations of each observer can be checked against those of the other(s).

Like case studies, naturalistic observation studies are limited in the extent to which the results can be generalized. In addition, naturalistic observation studies are very time-consuming. They must be repeated in a variety of settings so that researchers can be sure people's behaviour reflects development and not the influences of a specific environment.

Have you ever been questioned about health practices, such as sun exposure, alcohol use, or sexual activity, or for whom you plan to vote in the next election? If so, then you have participated in a **survey**, a study in which researchers use interviews and/or questionnaires to collect data about attitudes, interests, values, and various kinds of behaviours. Surveys allow researchers to quickly gather information. They can also be used to track changes over time.

CORRELATIONS A **correlation** is a relationship between two variables that can be expressed as a number ranging from -1.00 to $+1.00$. A zero correlation indicates that there is no relationship between those variables. A positive correlation means that high scores on one variable are usually accompanied by high scores on the other. The closer a positive correlation is to $+1.00$, the stronger the relationship between the variables. Two variables that change in opposite directions result in a negative correlation, and the nearer the correlation is to -1.00 , the more strongly the two variables are connected.

To understand positive and negative correlations, think about the relationship between temperature and the use of air conditioners and heaters here in Canada. Temperature and air conditioner use are positively correlated. As the temperature climbs, the number of air conditioners in use goes up. Conversely, temperature and heater use are negatively correlated. As the temperature decreases, the number of heaters in use goes up.

If we wanted to know whether age is related to memory, we could use a correlational study. All that would be necessary would be to administer memory tests to adults of varying ages and calculate the numerical correlation between test scores and ages. If there is a positive correlation between age and the number of memory errors people make—if older people make more errors—then we could say that our hypothesis has been supported. Conversely, if there is a negative correlation—if older people make fewer errors—then we would conclude that our hypothesis has not been supported.

naturalistic observation

the process of studying people in their normal environments



(Photo: ©Michael Doolittle/The Image Works)

Naturalistic observation refers to the research method used by psychologists who observe and study people in their natural, everyday environments.

survey

a data collection method in which participants respond to questions

correlation

a relationship between two variables that can be expressed as a number ranging from -1.00 to $+1.00$

Useful as they are, though, correlations have a major limitation: They do not indicate *causal* relationships. For example, even a high positive correlation between memory errors and age would tell us only that memory performance and age are connected in some way. It wouldn't tell us what caused the connection. It might be that younger adults understand the test instructions better. In order to identify a cause, we have to carry out experiments.

experiment

a study that tests a causal hypothesis

EXPERIMENTS An **experiment** is a study that tests a causal hypothesis. Suppose, for example, that we think age differences in memory are caused by older adults' failure to use memory techniques, such as repeating a list mentally to remember it. We could test this hypothesis by providing memory technique training to one group of older adults and no training to another group. If the trained adults got higher scores on memory tests than they did before training and the no-training group showed no change, then we could claim support for our hypothesis.

A key feature of an experiment is that participants are assigned *randomly* to one of two or more groups. In other words, chance determines which group each participant is placed in. When participants are randomly assigned to groups, the groups have equal amounts of variation with respect to characteristics such as intelligence, personality traits, height, weight, health status, and so on. Consequently, none of these variables can affect the outcome of the experiment.

experimental group

the group in an experiment that receives the treatment the experimenter thinks will produce a particular effect

Participants in the **experimental group** receive the treatment the experimenter thinks will produce a particular effect, while those in the **control group** receive either no special treatment or a neutral treatment. The presumed causal element in the experiment is called the **independent variable**, and the characteristic or behaviour that the independent variable is expected to affect is called the **dependent variable**.

control group

the group in an experiment that receives either no special treatment or a neutral treatment

In a memory technique training experiment like the one suggested above, the group that receives the memory training is the experimental group, and the one that receives no instruction is the control group. Memory technique training is the variable that we, the experimenters, think will cause differences in memory function, so it is the independent variable. Performance on memory tests is the variable we are using to measure the effect of the memory technique training. Thus, performance on memory tests is the dependent variable.

independent variable

the presumed causal element in an experiment

Experiments are essential for understanding many aspects of development. But two special problems in studying child or adult development limit the use of experiments. First, many of the questions researchers want to answer have to do with the effects of particular unpleasant or stressful experiences on individuals—abuse, prenatal influences of alcohol or tobacco, low birth weight, poverty, unemployment, widowhood. For obvious ethical reasons, researchers cannot manipulate these variables—they cannot ask one set of pregnant women to have two alcoholic drinks a day and others to have none. To study the effects of such experiences, they must rely on nonexperimental methods, such as correlations.

dependent variable

the characteristic or behaviour that is expected to be affected by the independent variable

Second, the independent variable that developmentalists are often most interested in is age itself, and researchers cannot assign participants randomly to age groups. They can compare 4-year-olds and 6-year-olds in their approach to some particular task, such as searching for a lost object, but the children differ in a host of ways other than their ages. Older children have had more and different experiences. Thus, unlike psychologists studying other aspects of behaviour, developmental psychologists cannot systematically manipulate many of the variables they are most interested in.

To get around this problem, researchers can use any one of a series of strategies, sometimes called *quasi-experiments*, in which they compare groups without assigning the participants randomly. Cross-sectional studies are a form of quasi-experiment. So are studies in which researchers compare members of naturally occurring groups that differ in some dimension of interest, such as children whose

parents choose to place them in daycare programs and children whose parents keep them at home. Such comparisons have built-in problems, because groups that differ in one way are likely to differ in other ways as well. Parents who send their children to private schools may be wealthier and have different social values compared with parents who keep their children in public schools. If researchers find that the two groups of children differ on a specific academic measure, is it because they have spent their school days in different environments or because of other differences in their families? Researchers can make such comparisons a bit easier if they select comparison groups that are matched on those variables the researchers think might matter, such as income, marital status, or religion. But a quasi-experiment, by its very nature, will always yield more ambiguous results than will a fully controlled experiment.

Research Designs for Studying Age-Related Changes

When a researcher sets out to study age-related change, she has basically three choices: (1) Study different groups of people of different ages, using what is called a **cross-sectional design**; (2) study the same people over a period of time, using a **longitudinal design**; (3) combine cross-sectional and longitudinal designs in some fashion, in a **sequential design**. (See Table 1.2.)

CROSS-SECTIONAL DESIGNS Figure 1.1 is a good example of a cross-sectional study in which researchers examined age differences in people's ability to recognize facial expressions. As you can see, in identifying anger, younger adults outperformed those who were older. If these findings fit the researchers' hypothesis, they might be tempted to conclude that the ability to identify anger in facial expressions declines with age. But we cannot say this conclusively based on the cross-sectional data, because these adults differ in both age and cohort. Thus, the age differences in this study might reflect, for example, differences in education and not changes linked to age or development. Influences of this kind lead to cohort effects, findings that are the result of historical factors to which one age group in a cross-sectional study has been exposed.

Furthermore, cross-sectional studies cannot tell us anything about sequences of change with age or about the consistency of individual behaviour over time, because each participant is tested only once. Still, cross-sectional research is very useful because it can be done relatively quickly and can reveal possible age differences or age changes.

LONGITUDINAL DESIGNS Longitudinal designs seem to solve the problems presented by cross-sectional designs, because they follow the same individuals over a period of time. Such studies allow researchers to look at sequences of change and at individual consistency or inconsistency over time. And because longitudinal studies compare performance by the same people at different ages, they get around some aspects of the cohort problem.

Learning Objective 1.10

Describe how cross-sectional, longitudinal, and sequential research designs differ.

cross-sectional design

a research design in which groups of different ages are compared

longitudinal design

a research design in which people in a single group are studied at different times in their lives

sequential design

a research design that combines cross-sectional and longitudinal examinations of development

Table 1.2 Research Designs

Design	Description	Advantages	Limitations
Cross-sectional	Participants of different ages studied at one time	Quick access to data about age differences	Ignores individual differences; cohort effects
Longitudinal	Participants in one group studied several times	Track developmental changes in individuals and groups	Time-consuming; findings may apply only to the group that is studied
Sequential	Study that combines both longitudinal and cross-sectional components	Cross-sectional and longitudinal data relevant to the same hypothesis	Time-consuming; different attrition rates across groups