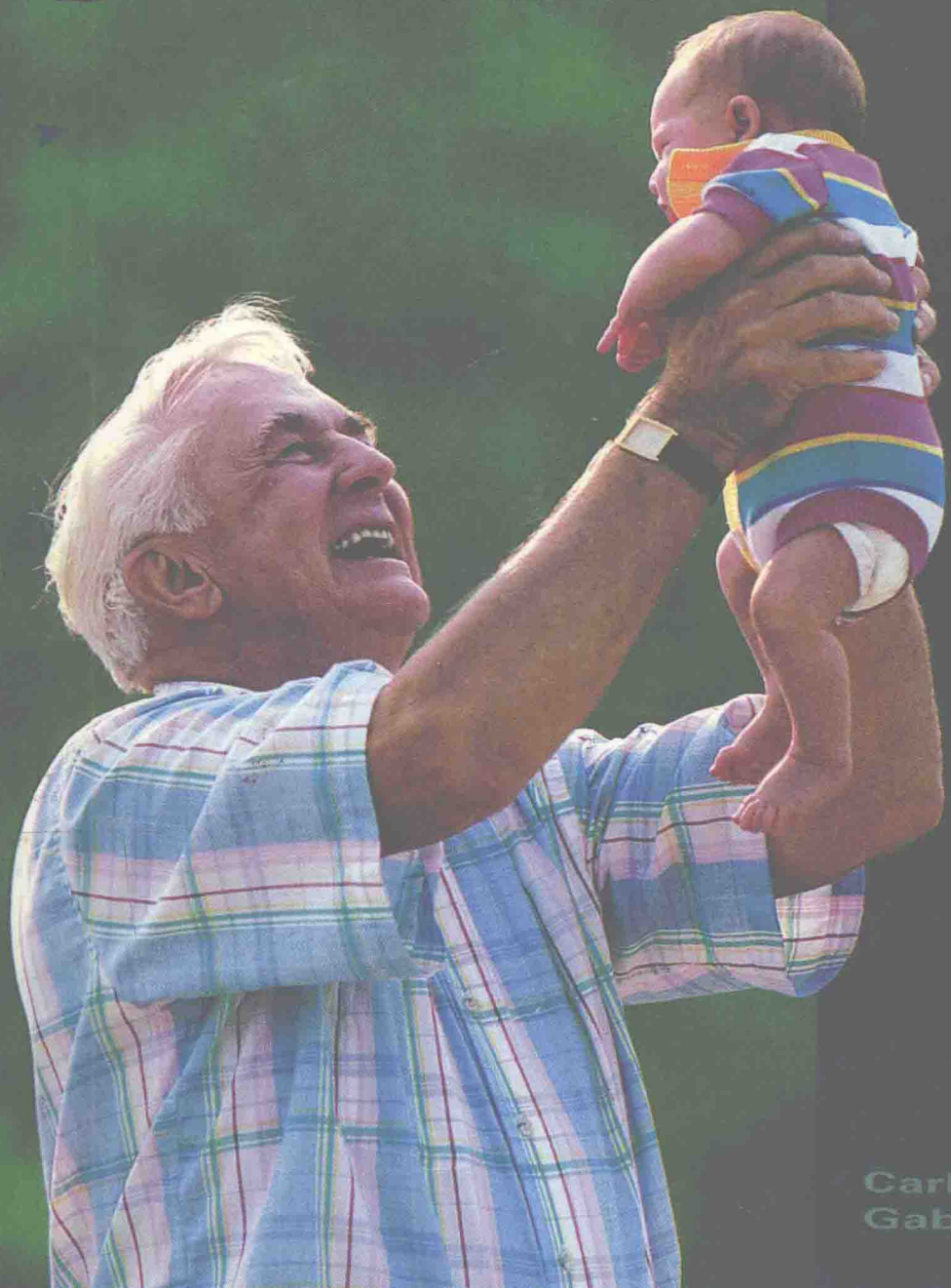
LIFELONG MOTOR DEVELOPMENT



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Preface

In recent years an exciting change in the approach to studying human development has emerged. While at one time the prevailing approach focused on changes that occur during infancy and childhood, more contemporary views have concentrated on human development from a lifelong (life-span) perspective. *Lifelong Motor Development* is a comprehensive and up-to-date, research-based discussion of growth, development, and motor behavior from conception through the adult years. Its contents originate primarily from the fields of developmental psychology, growth and motor development, motor behavior, and the body of literature on aging. To complement the lifelong approach and presentation of contemporary topics, the text is organized both chronologically and topically, thus providing the reader with a multidimensional perspective of development across the life span.

Lifelong Motor Development is divided into six parts and two appendixes. Part One is a single chapter presenting an overview of lifelong human development. The focus of the discussion is on the basic developmental principles, terms, and theoretical approaches and issues related to the study of human growth and development and motor behavior across the life span. The chapter also offers a conceptual model of the phases of motor behavior showing how the chronological stages of life-span development integrate with the evolution and regression of human motor performance. This model is used as the conceptual framework for the material presented in Part Four "Motor Behavior Across the Life Span."

Part Two is devoted to the body of information related to lifelong biological growth and development. Chapters 2, 3, and 4 provide topical discussions of the various hereditary, neurological, and physical characteristics which, together with experience, form much of the bases for motor behavior across the life span. Chapter 5 deals with factors and conditions that may affect the course of biological growth and development.

Part Three consists of two chapters providing comprehensive discussions of lifelong perceptual and information-processing characteristics. Chapter 6 examines perceptual development across time, emphasizing visual and kinesthetic perception and its relationship to motor behavior. Various theoretical viewpoints are also discussed. Chapter 7, "Information Processing and Motor Control," focuses on the developmental and aging characteristics that are related to the ability to process information and formulate a motor response. Specific discussions concentrate on attention, memory, processing speed and movement, and motor programming.

The chapters in Part Four provide a chronological description of motor behavior characteristics across the life span. Chapter 8 presents information on early movement behavior that occurs during the prenatal period through infancy. Chapter emphasizes the fundamental motor skill development and the progression of fine motor (manual) manipulative behavior that takes place during early childhood. The motor behavior characteristics associated with later childhood and the adolescent growth spurt represent the core of chapter 10. The material in this chapter underscores the bases for the age- and sex-related quantitative performance changes that occur during this period of phenomenal growth and development. Chapter 11, "Motor Behavior in the Adult Years," completes the section on lifelong motor behavior with discussions of motor performance at the peak of biological maturity, and the characteristics linked to regression. Up-to-date research findings on the relationship between longevity and physical activity are provided.

Parts Five and Six each are single chapters presenting information on assessing motor development and evaluating the sociocultural influences on motor development. Chapter 12 offers a broad perspective of the diversity of motor assessment techniques and discusses the considerations for selecting and implementing a wide variety of assessment instruments. Also included are descriptions of several well-known assessment tools. Chapter 13, "Sociocultural Influences on Motor Development," presents a discussion of the influence and importance of sociocultural factors on motor development from a lifelong approach.

Finally, two appendixes are included. Appendix A tells how to conduct both computer-assisted and manual literature searches on topics relevant to this text. Appendix B provides a variety of supplemental learning activities designed to augment the chapter objectives with practical "hands-on" experience. Chapter references are provided to allow for review of related text information.

Lifelong Motor Development is designed to serve both as an introductory and as a resource text for undergraduate and graduate students from the variety of disciplines associated with human development (e.g., physical education, education, psychology). One of the primary objectives in creating this text is to make it the most understandable text of its kind through both the organization of the content and the illustrations. Each of the larger parts of the text begins with an overview of its content. Included in the introduction of each chapter are *chapter objectives* and *key terms*. The objectives reflect the conceptual framework used by identifying the important facts, topics, and concepts to be covered. Marginal notations and page numbers are provided to aid the reader in identifying text material related to chapter objectives. Key terms pinpoint the words of the greatest importance to understanding the broader concepts of each chapter; these and other significant terms are highlighted throughout. A chapter *summary* and *suggested readings* are presented at the end of each chapter.

Acknowledgments

Needless to say, a project of this immensity is the result of the efforts of many people. While at times the task itself appeared to be "lifelong," it was the dedication and support of those individuals around me that provided a rejuvenating source of faith and energy. I owe a special debt of gratitude to Chris Rogers and his editorial staff for their professionalism and vision to make this text the very best available in lifelong motor development. I also wish to express considerable gratitude to my office staff, and to the reviewers whose suggestions significantly improved the manuscript. The reviewers were Robert Kraft, University of Delaware; Sally White, University of New Hampshire; Bob Hautala, University of Nebraska at Omaha; Sherry Folson-Meek, University of Missouri, Columbia; Jill Whittall, University of Wisconsin–Madison; Malvira Rau, Springfield College; Jacqueline Dailey, University of Wisconsin–Whitewater; Paul Bishop, Kearney State College; and Donna Hester, University of Alabama at Birmingham.

A final note of thankfulness is for the support, love, and patience of my wonderful daughters and wife, parents, and the Lord. For these are the sources of my inspiration, whose presence represent the true meaning of life's existence.

Contents

Part Four Motor Behavior across the Life Span

An Overview of Lifelong Human Development

developmental psychology, chapter 1 provides the initial introduction to the ways in which motor development parallels other human experience across the life span. Highlighting this section is a conceptual model of the phases of motor behavior illustrating how the chronological stages of life-span development integrate with the evolution and regression of motor performance. This model provides the foundation (conceptual framework) for much of the material presented in subsequent chapters.

Chapter 1

Introduction to the Developmental Perspective

Objectives

Upon completion of this chapter, you should be able to

1. Define the term *motor development* and describe its association with the life-span perspective. ***3***
2. Discuss the multidisciplinary approach to studying motor development. ***3***
3. Briefly describe the five major objectives of the developmental specialist. ***3***
4. Define the general terms that are unique to the fields of human and motor development. ***4***
5. Discuss and support eight major facts associated with human development. ***7***
6. Outline the periods of life-span development. ***8***
7. List the phases of motor behavior and briefly describe their characteristics. ***10***
8. Discuss the purpose and identify primary strategies used in conducting research in the scientific study of life-span development. ***12***
9. Name and describe the major traditional and contemporary theoretical views on human development. ***15***
10. Identify and briefly discuss the main controversial issues in human development. ***22***

Key Terms

motor development
life-span perspective
multidisciplinary approach
heredity
maturation
experience
learning
readiness
adaptation
growth
development
motor behavior
motor learning
motor control
cephalocaudal development
proximodistal development
phylogenetic behaviors
ontogenetic behaviors
differentiation
integration
aging
prenatal period
infancy
childhood
adolescence
adulthood
reflexive phase
rudimentary phase
fundamental movement phase
sports skill phase
growth and refinement phase
peak performance
regression
maturational theory
behavioral learning theory
social learning theory
Piaget's theory of cognitive development
psychosocial theory
information processing
ecological viewpoint
dynamical systems
continuity
discontinuity
nature versus nurture
stage
critical period
modifiability
reversibility

Objective 1.1

In general terms, **motor development** is the study of movement behavior and the associated biological change in human movement across the life span. From another perspective it may be viewed as the *process* of change in motor behavior resulting from the interaction of heredity and the environment. Basic to a comprehensive understanding of this field of specialization is knowledge related to the characteristics and principles of *growth* (change in size), *development* (change in level of functioning), and *motor behavior* (performance). Traditionally, this area of inquiry was studied by developmental psychologists primarily interested in the childhood stages of development. In more recent years, however, the scope of motor development has been extended in recognition that the developmental process is continuous and observable from conception to the final stage in human life. The basis for accepting this life-span perspective is formed on the theoretical notion that the developmental process extends beyond puberty and young adulthood. Significant physiological and motor behavior changes occur during older adulthood and are important to our understanding of the full scope of human development. The emergence of health-related physical fitness during the 1980s has developed a large body of information related to the exercise capabilities of the very young and old. Basic research in this area has done much to influence educational programs and enhance the quality of human life.

Objective 1.2

Along with the promising trend to view motor development from a **life-span perspective** has emerged the practice of studying behavioral change using an integrated **multidisciplinary approach.** It is generally accepted that behavior in any domain (i.e., cognitive, affective, psychomotor) is the product of many influences. To have a fuller understanding of human development, one should consider the full range of possible influences. Perhaps the strongest support for this point of view has been seen among those individuals interested in child development from a total-development perspective. While working both independently and cooperatively, professionals from such fields as developmental psychology, exercise physiology, medicine, biomechanics, physical education, and sociology have provided data adding to our understanding of total human development and behavior.

Objective 1.3

Developmental psychologists and motor development specialists seek to accomplish five major objectives: (a) to determine the common and characteristic changes in behavior, function, and appearance across the life span; (b) to establish when it is that these changes occur; (c) to describe what causes these changes; (d) to determine whether or not change can be predicted; and (e) to find out whether these changes are individual or universal.

Excellent commentaries by Clark and Whitall (1989), Seefeldt (1989), and Thomas and Thomas (1989) offer contemporary discussions on the description and history of motor development (see Suggested Readings).

General Terminology

Objective 1.4

As with any specialized field of science or education, motor development has established its own terminology and adopted words from related disciplines. The study of motor development cuts across several disciplines and subareas within the study of movement behavior and therefore uses a considerable amount of the general terminology of these related fields. Familiarity with this terminology will be important in developing a clear understanding of the developmental perspective.

Prerequisite Terms

Heredity refers to a set of qualities that are fixed at birth and account for many individual traits and characteristics. The cells of normal humans possess 46 chromosomes arranged in 23 pairs. These chromosomes are made up of thousands of genes that influence such traits as eye and hair color, personality, intelligence, height, and general body build. While these traits are strongly influenced by genetic structure, they may be modified by environmental factors.

The term **maturation** is often used interchangeably with the words *growth* and *development*. Maturation, however, is a more distinctive process, actually referring to the qualitative functional changes that occur with age. Maturation is also used to describe the successive tissue changes that take place until a final form is achieved. These changes are associated with the progression of an individual from one level of functioning to a higher level. Primarily innate (i.e., genetically determined) and resistant to external influences, maturation is a fixed order of progression; the time intervals may vary but the sequence of appearance of characteristics generally does not. The development of locomotion, for example, follows a consistent order (sit, walk, run) and an approximate age of appearance. The rate at which these motor capabilities are attained may differ among individuals, but the sequence generally remains fixed.

Experience refers to conditions within the environment that may alter or modify various developmental characteristics through the learning process.

Learning is defined as the relatively permanent change in performance that results from practice or past experience.

Readiness is the combination of maturation and experience that prepares an individual to acquire a skill or understanding.

Adaptation is the process of altering one's behaviors to interact effectively with the environment. The term is often used to describe the complex interplay between the individual and the environment. The developmental aspects of maturation and the individual's experience interweave to create behavior.

Figure 1.1 presents a graphic illustration of the interrelated nature of human development.