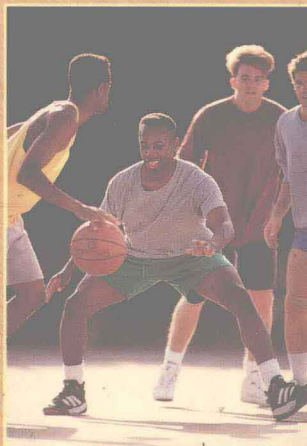
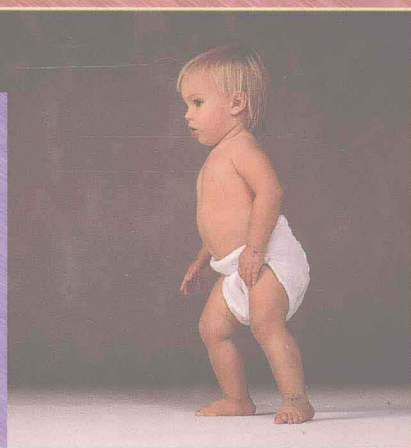


fourth edition

# *Understanding* **MOTOR DEVELOPMENT**

*Infants, Children, Adolescents, Adults*



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As always, *To the Sunshine of My Life:*  
Ellie, David Lee, Jennifer and Dan

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*Understanding*

# MOTOR DEVELOPMENT

# PREFACE

**Understanding Motor Development** is written for students taking a first course in motor development. It is presented in an easy-to-understand and easy-to-use manner to be of significant value to educators from a variety of disciplines, including kinesiology (physical education), physical and occupational therapy, special education, early childhood education, and elementary and secondary education. This text provides both descriptive and explanatory profiles of the individual from conception through adulthood.

## AUDIENCE

Development is a process that begins at conception and continues throughout life. This edition truly takes a life span approach by discussing motor development from conception through adulthood. Also, we have chosen to include primary cognitive and affective factors that affect motor development during each of these periods and have expanded coverage of these topics. Incorporating Dynamic Systems Theory along with the phases and stages of motor development help provide the reader with an explanatory basis as well as the descriptive profile.

## APPROACH

**Section One, Background**, provides the reader with essential introductory information on the study of motor development. Chapter 1, *Understanding Motor Development: An Overview*, examines the history, methods of study, research problems, and terminology used in the study of motor development. Chapter 2, *Models of Human Development*, offers a discussion of developmental models of child development. Particular attention is given to Dynamic Systems Theory as well as the works of Jean Piaget, Erik Erikson, and Urie Bronfenbrenner and the implications of each for motor development. In Chapter 3, *Factors Affecting Motor Development*, there is an important discussion of critical factors within the individual, environment, and movement tasks that influence the process of development throughout life. Section I concludes with Chapter 4, *Motor Development: A Theoretical Model*. It is here that a theoretical framework for studying the process of motor development is presented. The phases and stages of this life span model, as well as the subsystems of the task, the individual, and the environment serve as the organizational framework for the remainder of the text.

## CONTENT Organization

**Section Two, Infancy**, deals with a variety of important developmental topics of infancy. Chapter 5, *Prenatal Factors Affecting Development*, is devoted to discussion of those factors prior to birth that may affect later motor development. *Prenatal and Infant Growth* is the topic of Chapter 6. This chapter provides the reader with a descriptive profile of early growth processes. Chapter 7 examines *Infant Reflexes and Rhythmical Stereotypies* in the neonate and young infant. Particular attention is given to the integration of both into the

expanding movement repertoire of the young child. Chapter 8, *Rudimentary Movement Abilities*, discusses the rapidly expanding movement repertoire of infants. The major stability, locomotor, and manipulative tasks of this period are outlined and summarized. An extensive discussion of *Infant Perception* in Chapter 9 concludes the section on infancy. This chapter relates perceptual development to the motor behavior of infants.

**Section Three, Childhood**, provides the reader with a wealth of important information about childhood motor development. Chapter 10, *Childhood Growth and Development*, offers a general overview of cognitive, affective, and motor characteristics during early and later childhood. This sets the stage for the three chapters that follow. Chapter 11, *Fundamental Movement Abilities*, provides a practical, easy-to-use, three-stage approach (initial, elementary, mature) to observing and assessing the fundamental movement patterns of childhood. Mechanically correct line drawings provide a visual description that coincides with a brief verbal description of each stage, along with frequently encountered developmental difficulties. *Physical Development of Children* is the topic of Chapter 12. A review of the latest information on children's health-related fitness and motor fitness is presented along with information on fitness training for children. *Childhood Perception and Perceptual-Motor Development* is the topic of Chapter 13. Important information on both of these topics is reviewed and synthesized with a view toward their complex interaction with the motor behavior of the individual. Chapter 14 concludes the section on childhood with a discussion of *Childhood Self-Concept Development*. The latest information on self-esteem is reviewed along with the role of movement as an important facilitator of a positive self-concept.

**Section Four, Adolescence**, examines a number of important topics. Chapter 15, *Adolescent Growth, Puberty, and Reproductive Maturity*, opens this section with a wealth of important and useful information about physical change during this critical developmental period. Chapter 16, *Specialized Movement Abilities*, centers on the topics of specialized movement skill development, fostering improvement, and the developmental sequence of specialized movement skills. This is followed by a discussion of the *Physical Development of Adolescents* in Chapter 17 with a view toward their rapidly changing health-related and performance-related fitness. Chapter 18 concludes the section on adolescence with a discussion of *Adolescent Socialization*. Particular attention is given to the role of physical activity in the process of positive socialization.

**Section Five, Adulthood**, provides the latest information available on the rapidly developing area of adult motor development. Chapter 19, *Physiological Changes in Adults*, attempts to answer the question: Why do we age? A lively discussion is offered concerning changes in the adult musculoskeletal system, central nervous system, circulatory and respiratory systems, and sensory systems. Chapter 20, *Motor Performance in Adults*, examines reaction time, balance and postural control, falls, gait, activities for daily living, and the elite performer. Chapter 21, *Psychosocial Development in Adults*, examines a variety of psychological and social factors that influence and are influenced by the motor development and movement abilities of the aging adult.

**Section Six, Programming**, synthesizes information from the preceding sections. Chapter 22, *Developmental Physical Activity: A Curricular Model*, may be the most important to the field professional. This chapter presents a developmental approach to systematic movement skill acquisition throughout life. Numerous diagrams are used to synthesize the concepts presented in this chapter. This practical application chapter forms the basis for a companion text, *Developmental Physical Education For Today's Children* (Gallahue, 1996), which puts the concepts and principles described here to practical use through the implementation of developmentally appropriate movement programs. Finally, Chapter 23, *Assessing Motor Behavior*, takes a critical look at selected motor assessment instruments for infants and children, adolescents, and adults with a view to their utility in a variety of settings. Although this chapter is last, it is important for the reader to appreciate that all developmentally based programming begins with assessment as a means of ensuring individually appropriate educational experiences.

NEW TO THIS  
EDITION

Throughout the text, you will find numerous new topics and updates:

- The discussion of the models of human development has been extensively expanded to include ecological theories and the Dynamic Systems and Behavioral Settings branches. Specific tables within this discussion have been revised to facilitate learning.
- New updated coverage of adult development, including the enhancement of several figures, has been added to remain current with the ever-expanding knowledge base of physical activity. This critical information on older and elderly adults is becoming increasingly important as the baby boom generation ages and as more career opportunities develop outside the traditional school setting.
- To help students understand the impact activity has on teen health, we have expanded the discussion of the role that physical activity and sport participation has on maturation, physical health, and moral development of the adolescent.
- Only the most current language and terminology is used throughout the text, reflecting the discipline's continual evolution.
- Metric units are used throughout the text, which also facilitates international use of the material.
- A new end-of-chapter glossary, entitled **Key Terms to Remember**, helps students understand and retain the new language and terminology they are learning. An updated **Critical Readings** section in each chapter provides opportunities to further explore areas of interest.
- Updated throughout with the most current topical references.
- **Italicized words** throughout the text reflect important terms that the reader should know.

## PEDAGOGY

Throughout the text, you will find numerous pedagogical aids that enhance application and understanding of the content:

- **Chapter Competencies** begin each chapter and outline what students should master by the conclusion of the chapter.
- A brief **introduction** then highlights the chapter's content and sets the stage for an up-to-date research-based discussion.
- **Key Concepts** appear throughout the text and are identified by the hourglass icon. These help the reader focus more clearly on the key issues being discussed and reinforce the importance of obtaining a conceptual grasp of the process of motor development.
- The **Summary** found at the end of each chapter provides the reader with a concise overview and delineation of the major points discussed.
- A list of **Key Terms to Remember** at the end of each chapter provides a convenient glossary of important terms used in the chapter.
- **Critical Readings** conclude each chapter and refer the reader to additional sources of up-to-date information.
- A comprehensive **Bibliography** is found at the end of the text.
- Each chapter contains a wealth of **tables, figures, and line drawings** designed to synthesize information and provide the reader with a clear understanding of the topic being discussed.



## ANCILLARIES

**Instructor's Manual and Test Bank.** Written by the text's authors, this valuable resource features:

- Concept discussion outlines.
- Lecture outlines.
- Short answer and essay questions.
- Over 500 multiple choice questions.
- Laboratory exercises and suggested activities.
- Transparency masters of critical figures and tables.
- List of World Wide Web sites corresponding to textbook sections.

This is available free to adopters of the text.

**MicroTest III.** This computerized version of the test bank questions allows you to prepare custom exams along with your own text items. MicroTest is available in IBM DOS, Windows and Macintosh, and is available to qualified adopters.

**Assessment of Fundamental Motor Skills videotapes.** Developed by Dr. Arlene Anne Ignico, Ball State University, this series of twelve videotapes provides instruction in analyzing fundamental motor skills, including seven locomotor skills (running, hopping, galloping, jumping, sliding, leaping, and skipping) and five manipulative skills (throwing, catching, dribbling, kicking, and striking). Each video begins with an experienced performer demonstrating the skill and then provides questions and answers for the viewer regarding the performance criteria for children. You can purchase the videos in a convenient set of five or twelve, or as stand-alone tapes on specific locomotor or manipulative skills. Please contact your sales representative for more information.

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# BACKGROUND

*With Chiselled touch  
The stone unhewn and cold  
Becomes a living mould.  
The more the marble wastes,  
The more the statue grows.  
—Michelangelo*

S E C T I O N

1

## 1

UNDERSTANDING MOTOR  
DEVELOPMENT:  
AN OVERVIEW

## CHAPTER

## COMPETENCIES

*Upon completion of this chapter you should be able to:*

- Describe the research of several historical and contemporary scholars in motor development
- Compare and contrast motor development with other studies in human movement (motor learning, exercise physiology, biomechanics)
- Demonstrate knowledge of the various forms of analysis that are used in the study of motor development
- Discuss advantages and shortcomings of the major methodologies associated with the study of change
- Identify key methods of assessing biological maturity
- Describe common problems associated with the study of motor development
- List the chronological age classifications of human development across the life span
- Define terms unique to physical growth and biological maturation



**KEY  
CONCEPT**

**Motor development is continuous change in motor behavior throughout the life cycle, brought about by interaction among the requirements of the task, the biology of the individual, and the conditions of the environment.**



**T**he study of human development has been of keen interest to scholars and educators for many years. Knowledge of the processes of development lies at the very core of education whether it be in the classroom, the gymnasium, or on the playing field. Without sound knowledge of the developmental aspects of human behavior, educators can only guess at appropriate educational techniques and intervention procedures. Educators who are developmentally based in their instruction incorporate learning experiences that are appropriate not only for the chronological ages but also, and more importantly, for the developmental levels of the individuals being taught. Developmental educators recognize that although instruction is an important aspect of the teaching-learning process, instruction does not explain learning, development does.

**CONCEPT 1.1**

**Instruction does not explain learning, development does.**



Considerable research has been conducted and a number of texts have been written on the process of development. The research conducted on the developmental aspects of movement behavior has, in the past, been more limited in scope and magnitude than that conducted on the cognitive and affective processes of development. Historically, developmental psychologists tended to be only marginally interested in motor development, and then frequently only as a visual indicator of cognitive functioning. Likewise, social psychologists interested in the process of affective development gave only fleeting attention to movement and its influence on the social and emotional development of the individual. Since the primary thrust of motor development research has come from the many branches of psychology, it is natural that motor development has frequently been viewed in terms of its potential influences on other areas of behavior, and as a convenient and readily observable means of studying behavior, rather than a phenomenon worthy of study for its own sake.

**CONCEPT 1.2**

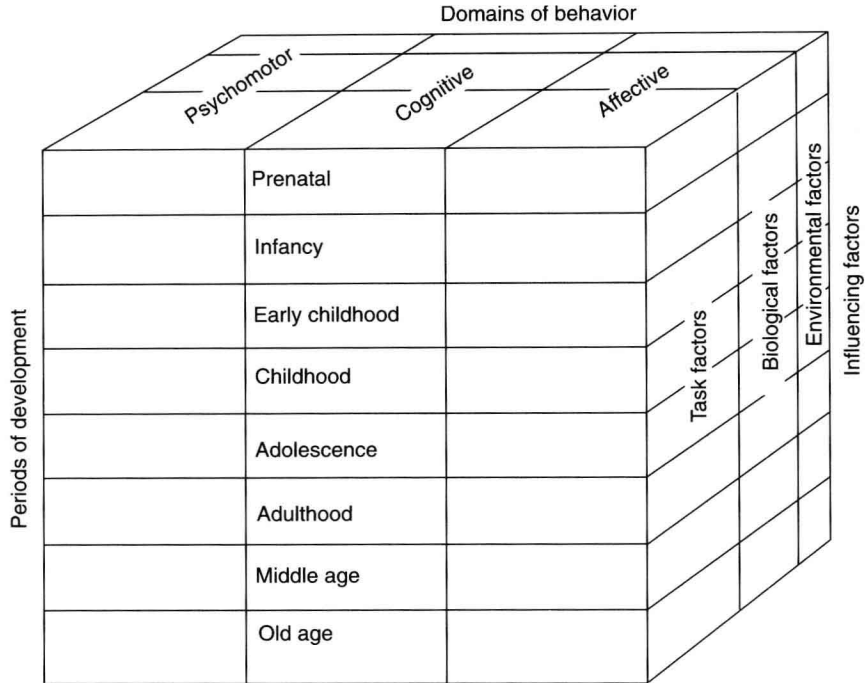
**The study of motor development in the past was overshadowed by interest in the cognitive and affective processes of development.**



The study of motor development as a specialized field of scholarly inquiry by kinesiologists did not gain real impetus until the 1970s. Motor development is a legitimate area of study that cuts across the fields of exercise physiology, biomechanics, motor learning, and motor control, as well as the fields of developmental psychology and social psychology. The quest for understanding progressed at a slow but steady pace in the 1960s, and

**FIGURE 1.1**

The compartmentalized view of human development



then began to escalate in the 1970s as developmental kinesiologists and psychologists alike shifted their focus away from a normative-descriptive approach back to the study of the underlying developmental processes.

During the 1980s an ever-expanding body of research by a new generation of scholars heightened interest in the study of motor development. An unprecedented amount of theory-based research has been conducted from the 1980s into the 1990s with developmentalists from a variety of fields interfacing with motor development scholars. The study of motor development has taken its place as a legitimate area of scientific inquiry within the fields of kinesiology and developmental psychology. Scholars are currently studying both the underlying processes of development and its many and varied products.

Human development is often studied from a compartmentalized standpoint, which has led to a rather unbalanced view of the developmental process. Development is frequently studied in terms of domains (cognitive, affective, psychomotor) or age-related behaviors (infancy, childhood, adolescence, adulthood, middle age, old age), or from a biological, environmental, or movement task perspective (figure 1.1). It is crucial that those interested in the study of motor development not compound the error of compartmentalization by replicating this model. The study of development must be viewed from the perspective of the totality of humankind. It must recognize that, at the very least, there is an interaction between the individual's biological makeup and his or her own unique environmental circumstances.