

Adult Development

John S. Dacey

with select chapters from
**Human Development Across
the Lifespan**
Sixth Edition

John S. Dacey
Boston College



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Adult Development

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Preface

Between the idea
And the reality
Between the motion
And the act
Falls the Shadow.

In a very real sense, these words of T. S. Eliot define the task of the lifespan psychologist. The ideas of the psychologists, philosophers, and scientists must undergo scrupulous testing before we can accept them as the reality that leads us to a greater understanding of human development. Since we wrote the previous edition of this book, stunning changes have taken place that help to dispel the shadows. New research into brain development, insights into the complex labyrinth of genetic interaction, the ever-expanding world of cognitive development are only a few of these changes that literally demand inclusion in any discussion of the lifespan.

And so, the goal for the lifespan psychologist is clearly identified: to present the most trustworthy, the most recent, the most pertinent, the most helpful facts and interpretations that will help readers comprehend the intricacies and subtleties of the journey through the lifespan. To achieve this goal, we followed these paths.

- We have expanded our coverage of those topics that promised insightful views of lifespan development and that were supported by careful and verified research, such as brain development and various aspects of marital satisfaction.
- We have intensified our efforts to highlight the practical and helpful implications of lifespan research and theory. For example, both theory and research have contributed significantly to the greater survival rate of premature infants. Another example would be new information on how hormones, and medicines related to them, can influence well-being.
- We have expanded our discussion of the role that culture plays in the development of all human beings, from birth to the later years.

- Finally, we have done our best to make this sixth edition of *Human Development Across the Lifespan* as reader-friendly as possible. By the examples that follow from the data, with the range of boxes, with the exercises provided, and with chapter introductions and conclusions, we hope that we have encouraged our readers to share in the excitement and satisfaction that accompanies our journey through the lifespan.

BASIC THEMES OF HUMAN DEVELOPMENT ACROSS THE LIFESPAN

Reflecting the exciting changes that are taking place in our knowledge of human development, we have woven our narrative around several integrating themes: the biopsychosocial model, the cultural context of development, the roles of age and gender, and applications to daily living. We return to these themes in each chapter as a means of making more meaningful the basic knowledge of human development.

The Biopsychosocial Approach

The *biopsychosocial approach* will help you to integrate the wealth of information that you will find in the pages to come. By thinking of lifespan development as the product of the interaction of biological, psychological, and social forces, you will better appreciate the complexity of development. For example, biological influences on development range from the role of genes in development to adult health concerns; psychological influences include all aspects of cognitive and personality development; social influences refer to such powerful forces as family, school, peers, and the media. The biopsychosocial approach helps to explain how the interaction of these forces is the key to understanding human development.

Contextual Influences on Development

Our goal in urging you to adopt a sociocultural perspective is to help you develop a greater understanding of those who seem “different.” If you adopt this perspective, you will come to realize that different people have different worldviews that decisively influence their thinking. People from different cultures do not always think like each other and, as we will stress, these differences are assets. Recognizing how diverse people are in their thinking and behavior will help you to identify and comprehend variations in how individuals are raised, how they think, and how they become functioning members of their culture.

In various places throughout the book, we will be discussing the four major tenets of the contextual model: the relative plasticity of life; the historical embeddedness of all development; the diversity of development; and the bidirectionality of the causes of all human behavior. Since we feel so strongly about the importance of these factors, you will find a discussion of sociocultural issues in each chapter. We also open several sections of the book with a sociocultural perspective on the issues to be discussed.

The Roles of Age and Gender

Inasmuch as this book is organized chronologically, we will be explaining the influence of age in every chapter. In some ways, the effects of age are quite apparent and in other ways its effects are subtle and complex. As concerns about gender equity have received more publicity, the stereotypes about males and females have slowly eroded. If people are treated according to stereotypic characteristics, then their potential is immediately limited. Although gender stereotyping is only one part of the gender story, it illustrates the importance of the relationship between gender and development. For example, children at an early age construct social categories from the world around them, attach certain characteristics to these categories, and label the categories. This process may be positive because it helps to organize the world; it may also be negative if the characteristics associated with the category are limiting—“girls just can’t do math.” We’ll examine how this theme plays out, both positively and negatively, throughout the lifespan.

Applications to Daily Living

The study of lifespan development is an exciting, rapidly changing, and highly relevant subject that can shed light on the developmental changes that you witness in yourself and see in your friends and family members of all

ages. To help you put the theories and research of this book into a meaningful framework, we have written several **An Applied View** boxes for each chapter. These range from the appeal of street gangs for some children, to the role of television in a child’s life, to an adolescent’s search for identity, to problems that the adult children of alcoholics encounter.

We have also included boxes that ask you to interact with the text’s material. Called **An Informed View**, these boxes are intended to help you think about and act on topics we have just discussed in the chapter. In these activities, you are invited to reflect on what your knowledge and your experience tell you about these matters. We do not present answers in these boxes. Rather, we hope you apply your best judgment to the issues we raise.

MAJOR CHANGES IN THE SIXTH EDITION

Thanks to suggestions from students who used the fifth edition of our text and the insightful comments of reviewers, we have made the following substantial changes in the sixth edition:

- An innovation from the previous edition, **An Informed View**, contains a World Wide Web icon that will prompt you to visit the text’s web site for additional information. We have added a number of new and more interesting sites.
- In addition to appearing at the end of the text in the glossary, definitions of key terms now appear within the margins of the text. This enhancement makes it easier for students to identify important terms and study them in preparation for exams.
- We have continued to add new examples of the biopsychosocial approach in this edition.
- Because we believe that the quotations that appear in each chapter in our book set the tone for that chapter, we have provided one as an opening, along with a vignette about human development, in each chapter.
- Earlier in this preface we mentioned that development is a lifelong process, which implies that lifespan psychology books must constantly change to accommodate fresh insights into the developmental process. To meet this challenge, we have made the following key changes in our chapters:

Chapter 1. Lifespan Psychology: An Introduction

- We have significantly rearranged the introductory material to bring our readers immediately into the reality of what passage through the lifespan means.
- The major change is the addition of a section entitled *Changing Views of the Lifespan*. This historical dis-

cussion of how ideas about human development changed over the years should give our readers a rich and thoughtful interpretation of human development.

Chapter 2. Theories of Development: Interpreting the Lifespan

- The section on Evolutionary Developmental Psychology has been substantially expanded.

Chapter 3. The Biological Basis of Development

- The discussion on the Human Genome Project has been expanded and updated.
- The biological data in the chapter have also been updated to reflect new ideas that have appeared since the last edition (cloning, DNA, etc.).

Chapter 4. Pregnancy and Birth

- Substantial revisions have been made to this chapter, particularly with regard to the nervous system. Beginning with the embryonic period, new data, new examples, and new diagrams greatly enhance the discussion.
- In the section on maternal emotions, the classic work of Ruth Rubin has received considerable coverage to enrich the presentation of maternal influences.
- There is a new section devoted to cultural variations in the birth process.
- The discussion of prematurity has been increased and the groundbreaking work of Heidi Als is presented in greater detail.

Chapter 5. Physical and Cognitive Development in Infancy

- The introduction to Chapter Five has been rewritten to reflect different views of infancy in a manner that brings our readers into the infant world as soon as possible.
- The most significant changes in this chapter relate to brain development. A box entitled *Building the Brain Structures* adds a new, development dimension to the discussion.
- New work on neuronal communication with new diagrams has also been added.

Chapter 6. Psychosocial Development in Infancy

- A new introduction more meaningfully brings readers into the chapter's content. Statements by leading

figures—Bowlby, Ainsworth—link their ideas more tightly to the chapter's discussion.

- Jerome Kagan's new work—*The Long Shadow of Temperament*—has been added to the analysis of temperament. Stressing biological aspects, it is a controversial viewpoint, one that deserves attention.

Chapter 7. Physical and Cognitive Development in Early Childhood

- A new introduction connects the chapter's content more tightly to the chapter's beginning (comments by John Flavell, Berry Brazelton, Steven Pinker).
- New and more developmental data on the brain has been added.
- Several illustrations have been added to the presentation of Kellogg's ideas on artistic development so that readers can identify the developmental features of children's drawings.
- The theory of mind section has been changed to more precisely indicate how children represent their world.

Chapter 8. Psychosocial Development in Early Childhood

- The introduction to the chapter was rewritten (using the early years of Mahalia Jackson) to emphasize the importance of culture and to bring readers into the chapter's material more quickly and to stress the level of development emphasized in the chapter.
- The day care section was reworked to include recent studies and to summarize conclusions concerning cognitive and psychosocial outcomes of early child care.

Chapter 9. Physical and Cognitive Development in Middle Childhood

- The opening to the chapter was redone to illustrate the growing cognitive competence of middle childhood children. The young Thomas Edison, always popular, was used as an example.
- The physical development section was changed to incorporate new data about brain development during these middle childhood years.
- An entirely new section devoted to exceptional children was added to the chapter, including implications of legislation (IDEA, for example).
- The notion of literacy—including such categories as basic, scientific, technological, etc.—was introduced in the language development section together with the belief that knowledge of development is

a major necessity for matching children with their books.

Chapter 10. Psychosocial Development in Middle Childhood

- A substantial section on ADHD has been added to the discussion of impulse control.
- The work on stress has been notably revised to incorporate the ideas of Abraham Maslow whose ideas have been recently given more and more attention in developmental psychology. This adds greater practicality to the effects of stress.

Chapter 11. Physical and Cognitive Development in Adolescence

- We have added sections on changing attitudes toward menarche.
- Cultural identity is an important part of this chapter on adolescence.
- A new look at the relationship between emotions and brain development is offered.
- There is a complete new section on types of mental disorders.
- We have included a new box on high stakes testing.

Chapter 12. Psychosocial Development in Adolescence

- Father absence and the role of parents are updated.
- We have incorporated a new segment on Internet bul-lies.
- The heritability of homosexuality and lesbianism are considered.
- Statistics on illicit drug use (mainly Ecstasy, LSD, and PCP), excessive alcohol use, and cigarette use are updated and discussed.
- Gang behavior, the use of guns, and other risk factors in youth violence are considered anew.

Chapter 13. Physical and Cognitive Development in Early Adulthood

- The “adultoid” is a new concept in this chapter.
- We have added a new box on choosing a career.
- There is a revised look at the role of fathers in raising children.
- We have added a new box on working mothers and work-family conflicts.
- Home-based work patterns are reviewed.
- We introduce a new box on effects of culture on research findings in general.

Chapter 14. Psychosocial Development in Early Adulthood

- New information on cohabitation is included.
- The discussion of networks of non-relatives and friends, as well as mother-daughter relationships, has been revised.
- Sternberg’s theory of love is discussed in more depth.

Chapter 15. Physical and Cognitive Development in Middle Adulthood

- Food imbalances are the focus of a new section.
- We offer a new segment on the causes of decreased ability to smell.
- Information on menopause and sex is presented in greater detail.
- Our coverage of hormone replacement therapy has been substantially enlarged.
- Effects of “spillover” and burnout are given additional consideration.

Chapter 16. Psychosocial Development in Middle Adulthood

- Coping with debilitating anxiety receives added attention in the section on stress in this chapter.
- Marital satisfaction and our ability to predict divorce are given more attention.
- Important new research on the middle-aged person’s relationships with aging parents is presented here.
- New research on dual-career households is covered.
- A completely updated continuous traits theory takes the place of Costa and McCrae’s earlier ideas on this aspect of personality development.

Chapter 17. Physical and Cognitive Development in Late Adulthood

- We provide new data on the aging gastric system.
- Startling new information on Alzheimer’s and memory, as well as new views on Alzheimer’s and innovative educational techniques, are presented in this Chapter on elderly development.
- The effects of aging on mental ability in general are also covered.

Chapter 18. Psychosocial Development in Late Adulthood

- Sexuality in the elderly receives fresh attention in this chapter.

- The discussion of treatments for erectile dysfunction, a topic that has often been in the news lately, has been updated.
- We include a new segment on the relationship between long-standing marriages and illness.

Chapter 19. Dying and Spirituality

- In a new section, we look at differences among suicide attempters.

TEACHING—LEARNING FEATURES OF THE SIXTH EDITION

You will enjoy and learn from this book to the extent that its topics, organization, and clarity make its contents meaningful to you. Helping you to master the book's contents in as uncomplicated a manner as possible has been the most important pedagogical goal of our work. To accomplish this task, we have built into each chapter a number of features, described here. The *Student Owner's Manual* that follows this preface also walks you through these features by pairing examples of features with explanations of their use.

- *Chapter Outlines.* The major topics of each chapter are presented initially so that you may quickly find the subject you need. An outline helps you to retain material (a memory aid) and is an efficient method for reviewing content.
- *Opening Quotation.* Each chapter opens with a quotation that sets the tone for what follows.
- *Opening Vignette.* Each chapter opens with a vignette that illustrates the chapter's content. These vignettes are intended to demonstrate how the topics described in the chapter actually work in the daily lives of human beings, young and old.
- *Chapter Objectives.* Following the introductory section of each chapter, we present a concise list of questions that are answered in the chapter to guide your reading. When you finish reading the chapter, return to the list and test yourself to see if you can respond to their intent; that is, can you analyze, can you apply, can you identify, can you define, can you describe?
- *View Boxes.* We have designed our boxes to expand on the material under discussion and to do so in a manner calculated to aid student retention. The view boxes are of three types:
 1. *An Informed View.* Here we present controversial issues and you are asked to give your opinion after you have studied the facts. In some cases these boxes are accompanied by an icon indicating that additional information can be found on the World Wide Web.
 2. *An Applied View.* Here you will see how the topics under discussion apply to an actual situation, in settings such as a classroom or a medical facility.
 3. *A Sociocultural View.* Here we analyze the contributions of different cultures to individual development, as well as research on newly discovered influences of aging, gender, and other social factors.
- *Conclusion & Summary.* At the end of each chapter you will find a brief concluding statement that summarizes the main themes of the chapter. This statement provides you with a quick check of the purpose of the chapter and the content covered. Immediately following the brief concluding section is a more detailed set of summary statements that are grouped according to the major topics of the chapter. This section should help you to review the chapter quickly and thoroughly.
- *Key Terms.* In addition to the list that appears at the end of each chapter, you will also find definitions of key terms within the chapter's margins. These terms are highlighted and explained in the context of the chapter. We urge you to spend time mastering the meaning of each of these terms and relate them to the context in which they appear.
- *What Do You Think?* Following the Key Terms, you will find a series of questions intended to have you demonstrate your knowledge of the chapter's content, not only by applying the material to different situations but also by asking you to be creative in answering the question or solving the problem.
- *Suggested Readings.* Interspersed in appropriate places throughout the text, you will find an annotated list of four or five books or journal articles that we think are particularly well suited to supplement the contents of the chapter. These references are not necessarily textbooks; they may not deal specifically with either education or psychology. We believe, however, that they shed an illuminating light upon the chapter's material.
- *Student Study Guide.* We include a student study guide in the body of the text, in the form of Guided Review sections, as one means of making the material as meaningful as possible and to aid retention.
- *Chapter Review Test.* At the end of each chapter we provide 15 to 20 sample test questions, along with an answer key, to allow students to check their understanding of the chapter's content.

SUPPLEMENTARY MATERIALS

The supplements listed here may accompany Dacey & Travers's *Human Development Across the Lifespan*, sixth edition. Please contact your local McGraw-Hill

representative for details concerning policies, prices, and availability, as some restrictions may apply.

For the Instructor

Instructor's Manual by Teresa Beeler Hutchens, Ph.D., University of Tennessee and Test Bank by Patti Price, Ph.D., Wingate University

The *Instructor's Manual* to accompany the sixth edition of *Human Development Across the Lifespan* includes new teaching ideas for each chapter, as well as a summary outline, learning objectives, key terms, lecture suggestions, classroom or student activities, and questions for review and discussion. In addition, we have included supplementary resources for both video/ film and Web site use for the human development instructor. The summary outline and learning objectives closely follow the text and highlight important concepts and topics from each chapter. The learning objectives are also used in the test bank to help instructors select supporting questions. Key terms from the text are listed to show which terms need to be emphasized within lectures. Complete lecture suggestions that give entertaining, yet educational, ideas on how to enliven classroom discussion of the text material are provided as well. In addition, classroom activities serve to provide hands-on suggestions for applying course material to students' everyday lives in and out of the classroom. Questions for review and discussion are available for each chapter to aid instructors in promoting class participation and/or as essay question assignments.

The *Instructor's Manual* can be found on the *Instructor's Resource CD-ROM* and on the book Web site (www.mhhe.com/dacey6).

The *Test Bank* provides instructors with more than 1,500 test questions specifically related to the main text. This testing tool includes multiple-choice questions for each chapter from which to develop test materials. In addition, each test item is identified by type as factual, conceptual, or applied for easier test development. The *Test Bank* is available in Microsoft Word format and in computerized format on the *Instructor's Resource CD-ROM*.

Instructor's Resource CD-ROM

This teaching tool offers instructors the opportunity to customize McGraw-Hill materials to create their lecture presentations. Resources include the *Instructor's Manual*, *Test Bank/Computerized Test Bank*, PowerPoint presentation slides, and the *Image Database for Developmental Psychology*.

PageOut—Build Your Own Course Web Site in Less Than an Hour

You don't have to be a computer whiz to create a Web site, especially with an exclusive McGraw-Hill product

called PageOut™ that requires no prior knowledge of HTML—no long hours of coding and no design skills on your part. www.pageout.net

The McGraw-Hill Developmental Psychology Image Database & Overhead Transparencies

This set of 200 full-color images was developed using the best selection of our human development art and tables and is available in electronic format on the text's Web site and as part of our *Instructor's Resource CD-ROM*, as well as in a print overhead transparency set. These images have been selected to correspond with the instructor's manual. Plus, instructors can add their own lecture notes to the electronic images as well as organize the images to correspond to their particular classroom needs.

Online Learning Center

This extensive Web site, designed specifically to accompany Dacey & Travers's *Human Development Across the Lifespan*, sixth edition, offers an array of resources for both instructor and student. PowerPoint Presentations by Kimberly Foreman, the Developmental Psychology Image Database, Web Links, and more resources can be found by logging on to the text site at www.mhhe.com/dacey6.

Annual Editions—Human Development 05/06

Published by Dushkin/McGraw-Hill, this is a collection of 45 articles on topics related to the latest research and thinking in human development. These editions are updated annually and contain helpful features, including a topic guide, an annotated table of contents, unit overviews, and a topical index. An instructor's guide containing testing materials is available.

Sources: Notable Selections in Human Development

This is a collection of over 40 articles, book excerpts, and research studies that have shaped the study of human development and our contemporary understanding of it. The selections are organized topically around major areas of study within human development. Each selection is preceded by a headnote that establishes the relevance of the article or study and provides biographical information on the author.

Guide to Lifespan Development for Future Educators & Guide to LifeSpan Development for Future Nurses

These course supplements help students apply the concepts of human development to education. Each supplement contains information, exercises, and sample tests designed to help students prepare for certification and understand human development from a professional perspective.

For the Student

Online Learning Center

The official Web site for the text contains chapter outlines, practice quizzes that can be e-mailed to the profes-

sor, links to relevant Web sites, and other interactive activities such as crosswords and flashcards. www.mhhe.com/dacey6.



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John Travers has worked with young people all his professional life, beginning with his own four children. He has taught in elementary and high school and now teaches undergraduate and graduate students at Boston College, where, among a faculty of 1,000, he was recognized as one of eight outstanding teachers in the university. He has also been honored as Teacher of the Year. His undergraduate and graduate teaching has been in the field of developmental psychology. Teaching, counseling, and writing have been constant themes in his professional life. He has written 17 books and approximately 30 professional articles.

To the Student

Owner's Manual: A Guide to Content Features

Chapter Outlines

The major topics of each chapter are presented initially so that you may quickly find the subject you need.

Opening Vignette

Each chapter opens with a vignette that illustrates the chapter's content. These vignettes are intended to demonstrate how the topics described in the chapter actually work in the daily lives of human beings, young and old.

688 part 2 Beginnings

quicken its own research pace (McElheny, 2003). Finally, on June 26, 2000, Dr. Francis Collins, director of the National Human Genome Research Institute, and Dr. J. Craig Venter, president of Celera Genomics, announced at a White House ceremony that they had been successful.

Owing to recent genetic research, the promise for the future of all human endeavors is staggering. Once specific genes are identified and located, scientists can direct their efforts to combat thousands of genetic diseases. Perhaps equally as exciting is the attempt to identify "susceptibility" genes, which do not of themselves cause disease but make certain individuals susceptible to such diseases as breast cancer, colon cancer, and Alzheimer's. All of the principal researchers—James Watson, Francis Collins, Craig Venter—agree that we have now entered a time of an astounding new array of biological studies.

We would like you to think of this chapter in the same way you would draw a map. In this case, however, you'll be studying the inherited map of yourself, now spelled out in exquisite detail in the *Human Genome Project* (HGP). But you may well ask, What value is a map of our genes? Other practical contributions of DNA research include its use in paternity identification and criminal investigations. Aside from the contribution it is making to human knowledge, the potential it offers for identifying and curing disease is inestimable.

In this chapter you'll read about the fertilization process, during which the sperm and egg unite. Today, however, we can no longer refer to "the union of sperm and egg." We must ask additional questions: Whose sperm? Whose egg? Where did the union occur? Was it in the woman's body? Which woman will carry the fertilized egg? You can see, then, that fertilization is a process filled with the potential for conflict and controversy because of new techniques that enable fertilization to occur outside of a woman's body.

Our characteristics, however, don't just appear; they're passed on from generation to generation. Following our discussion of genes, we'll trace the manner in which hereditary traits are transmitted. Unfortunately, we are all too well aware that occasionally the transmission of traits produces abnormalities, which we also discuss. Finally, no discussion of human heredity is complete without acknowledging the ethical issues that have arisen because of these new developments. Answers elude us, but at least we can ask several critical questions: Should scientists be allowed to implant specific genes to satisfy a couple's preferences? Should society determine that certain types of genes be implanted to ensure "desirable" products? No easy questions, these, but you can be sure that they will arise in the future.

Chapter Objectives

After you read this chapter, you should be able to answer the following questions.

- How does fertilization, both natural and external, occur?
- What are the mechanisms of heredity and what could go wrong?
- What are the major features and anticipated uses of the Human Genome Project?

THE FERTILIZATION PROCESS

The fusion of two specialized cells, the sperm and the egg (or ovum), mark the beginning of development, and the zygote (the fertilized ovum) immediately begins to divide. This fertilized ovum contains all of the genetic material that the organism will ever possess.

chapter

The Biological Basis of Development


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At first glance, James Watson and Francis Crick looked like any other young instructors at England's Cambridge University. But there was soon to be revealed something quite different about them. On a winter's day in 1953, they shocked the biological world and took the first step toward their future Nobel Prizes when they burst into a pub near their laboratory and announced to their astonished colleagues that "they had discovered the secret of life." Just hours before, they had finally determined the exact model of DNA. After years of theory building, testing, failure, and theory revision, Watson and Crick persevered and triumphed. The significance of their discovery can't be overlooked. As Watson noted in a speech delivered at Cold Spring Harbor Laboratory in 1989: "When finally interpreted, the genetic messages encoded within our DNA molecules will provide the ultimate answers to the chemical underpinnings of human existence." These are strong words that reflect the magnitude of the work that signaled a new era in biology.

But the chase had only begun. Although the structure of DNA was now known and provided clues as to function, the question remained, How does this structure actually work? Francis Crick initially charted the course when he speculated that genetic information stored in DNA flows through RNA to proteins (Micklos & Freyer, 2003). Information in DNA is stored as a code (as we'll see in this chapter) and is then translated into the language of RNA, which eventually directs the formation of proteins.

Now the race began in earnest. After the discovery of the double helix model in 1953, intense interest mounted as efforts to probe more deeply into genetic action accelerated. Craig Venter, who had been associated with the Human Genome Project, left and eventually became the head of Celera and vigorously pursued DNA sequencing. This, in turn, spurred the government team headed by Francis Collins to



With approximately 3 million individuals in the United States who are thought to be infertile, many couples are consulting fertility specialists. Can you describe the most common causes of infertility?

Chapter Objectives

This is a concise list of questions that are answered in the chapter to guide your reading. Once you've finished the chapter, you should be able to analyze, apply, identify, define, and describe.

A Sociocultural View

These essays provide analysis of different cultures to individual development, as well as research on newly discovered influences of aging, gender, and other social factors.

Suggested Readings

Interspersed throughout the text are titles of book and journal articles that are particularly well suited to supplement the contents of the chapter.

Cook-Dean, R. (1995). *The gene wars: Science, politics, and the human genome*. New York: Norton. You will find this an excellent, readable account of the Human Genome Project. The personal issues are especially appealing.

- **Psychological impact.** Is there any stigma attached because of a person's genetic makeup?
 - **Genetic testing.** If there's a specific family history of a disorder, what is the role of genetic testing? How should people be informed about their predisposition to disease? (Patenaude, Guttmacher, & Collins, 2002).
 - **Reproductive issues.** What role does genetic information play in decision making and reproductive rights?
 - **Clinical issues.** What type of and how much education are necessary for health care providers? What are desirable standards and quality control measures?
 - **Commercialization.** Who controls property rights and accessibility of data?
- Finally, a good way to summarize our work in this chapter is to remember that the outcome of genetic action can only result from its interaction with environmental experiences.

Guided Review

15. _____ first made us aware of dominant and recessive characteristics.
16. When several genes contribute to a trait, this is called _____ inheritance.
17. Down syndrome is perhaps the best-known _____ disorder.
18. _____ autism and _____ disease are examples of genetic disorders.
19. Mapping the human genes is the goal of the _____.
20. The results of the latest genetic research reinforce the belief that development is explained by the _____ of genes and the environment.

CONCLUSION & SUMMARY

In this chapter we explored the biological basis of our uniqueness. We considered not only the power and beauty of nature in establishing our genetic endowment but also the growing influence of technology. The genes the mother and father provide unite to produce a new and different human being, yet this new life still shows many of the characteristics of both parents. We saw how this newness and sameness have challenged researchers for decades.

Beginning with the discoveries of Mendel and still continuing, the secrets of hereditary transmission remain at the forefront of scientific endeavor, especially given the impetus of the Human Genome Project. Today's work, building on our knowledge of DNA, provides hope for the future while

simultaneously raising legal and ethical questions that have yet to be resolved.

Have these fertilization both maternal and paternal success?

- Knowledge of hormonal control of the menstrual cycle is crucial for understanding fertilization.
- The study of twins, especially monozygotic twins, has long fascinated psychologists.
- The increasing number of infertile couples has led to a growing demand for external fertilization.
- The most widely used external fertilization technique is AID (artificial insemination by donor).

- The success rate of external fertilization procedures has improved with increasing knowledge.
- Today's adoption procedures include both closed and open adoption.

- What are the most hereditary of fertility and what could go wrong?
- Mitosis and meiosis are the means of cell division.
- DNA is the chemical key to life.
- Understanding how traits are transmitted requires a knowledge of the workings of dominant and recessive genes.

Answers
15. Mendel 16. polygenic 17. chromosomal 18. Down's 19. Human Genome Project 20. interaction

An Applied View

These essays provide examples to demonstrate how the chapter material relates to real-life situations.

OF part 2 Beginnings



Romana, friends of ours, Steve and Nancy, decided to adopt a Romanian orphan girl of 15 months. Their story is both touching and moving, as well as a detailed chronicle of what's involved in the process.

The young couple examined the pros and cons of both domestic and foreign adoption and ultimately decided on a foreign adoption. They felt there were too many complications with most domestic adoptions, less certain outcomes, and often very lengthy waits. The downside of an international adoption is that generally the children are older and often spend a year or more in an orphanage.

The adoption agency they worked with was certified by the Romanian government. The agency had a Romanian husband and wife team working to identify adoptable children and assist with negotiating the process in Romania and with helping the adoptive parents once in Romania. The son of this couple works for the agency in the U.S.A. and communicates regularly with his parents.

Steve and Nancy were told they must use one of the certified agencies in order to adopt. They also needed to follow Massachusetts law for a detailed home study, including criminal background checks. In addition, they had to apply to the Immigration and Naturalization Service (INS) for approval. They were also checked by the FBI. The only input they had to the adoption process was to specify a child as young as possible; the agency matched children and parents. On a second adoption, however, prospective parents are allowed to specify the sex.

They found going through the Romanian system a difficult process. They were told about Katie in June and submitted going to Romania the following September to get her. Katie is from the same orphanage. The home study done in Steve and Nancy plus their INS paperwork were submitted to the Romanian Adoption Review Committee, which approved them as adoptive parents. The birth parents' must also give their permission for the child to be adopted.

Once the adoption committee approves both parents and children, the paperwork goes back to the local court for finalization. Next, a home study is held followed by an approval. Ultimately the adoption paperwork was completed in early January. They had to wait three weeks for Katie's passport and then went back to Romania to bring her home.

At the orphanage, Steve and Nancy were able to see only the most entry way and a small room off to the side. They were told that this orphanage was the best in the country. Surprisingly, the director was well informed, with degrees in early childhood education. The orphanage seemed bright and clean, and the children are asked outside to play, which is very unusual in Romania. There were Disney characters on the wall and Pinocchio pictures of the children sitting with their parents.


Katie will be 22 months old on September 4 and is a normal toddler. She's very active, has good motor skills, is beginning to walk, is very verbal (she does not get her own way and Steve and Nancy to see how much she can get away with—very unusual reactions for an almost 2-year-old). The only problem seems to be a language delay, but communication seems to be normal. A speech pathologist has recommended a re-evaluation in 4 months, with the belief that her language skills will explode before then. She is now making much of what Steve and Nancy say to her; but it would appear that she will really overcome this language delay.

In summary, Katie went into a warm, loving environment, has adjusted well, and seems on the way to a normal and happy childhood.

Guided Review Questions

Acting as an integrated study guide, these questions help you to study what you've just learned.

Chapter 3 Pregnancy and Birth 197



"By the time I saw her, it was just too late." Frustrated surgeons have angrily uttered those words for many years, but now thanks to sophisticated surgical procedures, it may not be too late. Today, the promise of surgery before birth offers hope to every anguished parent. These types of fetal surgery have received considerable attention.

First, to cure a condition in which the brain ventricles fill with fluid and expand (called fetal hydrocephalus), surgeons now expose within the womb. In 1986, after repeated failures to lower shunt into the fetus's brain, the Fetal Medicine Society asked surgeons to create their own. Recently, with improved techniques, successful attempts have been reported (Greenman, 1999).

The surgeon must puncture the woman's abdomen and uterine wall, penetrate the fetal skull, and then insert a tube (catheter) into the brain to drain this region until birth. This procedure is called "open fetal surgery"; newer techniques employing ultrasound and this instrument are being developed (Fleischer, 1999). Unless this condition is treated, fluid pressure against the walls (ventricles) of the fetal brain increases and can cause mental retardation or even death.

In a second type of fetal surgery, to correct a blocked urinary tract in the fetus (called fetal hydronephrosis), the surgeon removes the fetus from the womb, opens it, and then repairs the fetus in the uterus. The surgeon then seals either side of the

incision (cut wound) or amniotic fluid that has been saved and returned, and finally, sews the uterus. This surgery could not be accomplished unless drugs promoting labor were available. If the condition is not corrected, the lungs of the fetus cannot develop. The blocked urinary tract causes urine to stay in the bladder, which can eventually burst. Urine backs up into the kidneys, causing serious damage. The major problem is that the fetus stops producing amniotic fluid, which is mainly urine. The fetus swallows amniotic fluid, which causes the lungs to grow. Without the amniotic fluid, the lungs don't grow; in short, the fetus simply can't breathe.

Finally, to correct a condition in which the fetus has a hole in its diaphragm, the muscle separating the abdomen from the chest cavity (a condition called diaphragmatic hernia), surgeons make an incision across the uterus and cut into the fetal chest and abdomen. Surgeons push back into the abdomen any abdominal organs that might have moved through the hole in the diaphragm into the chest cavity. They then close the hole. Without this surgery, the abdominal organs that have pushed into the chest cavity restrict the growth of the lungs, and eventually the fetus cannot breathe.

***Kotkin, G. (1990). *The baby doctors*. New York: Dell. You should find this book fascinating, a living account of the types of surgery now being performed on infants and newborns.

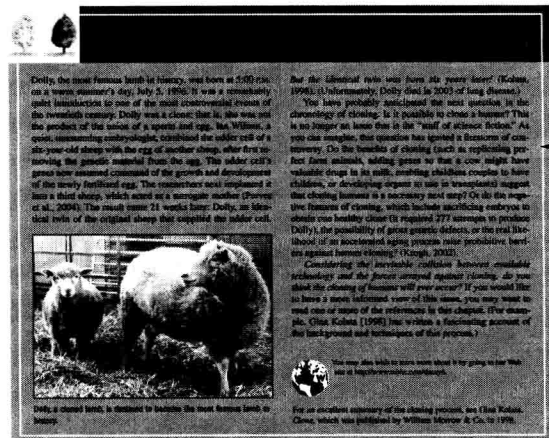
During fetal testing, the fetal heart rate changes and movement increases, suggesting that the fetus has sensed tactile stimulation. Muscular development of the eyes enables the fetus to move its eyes during sleep or to change its position. From about the 16th week the fetus is sensitive to any light that penetrates the uterine wall and the amniotic fluid. Toward the end of pregnancy, a bright light pointed at the mother's abdomen causes the fetus to move. The fetus begins to swallow amniotic fluid early in the pregnancy and demonstrates taste by turning toward and swallowing more of a sweet substance injected into the amniotic fluid.

This description of fetal life leads to an inevitable conclusion: Given adequate conditions, the fetus at birth is equipped to deal effectively with the transition from its sheltered environment to the extraterrestrial world.

We can summarize these developments as follows:

- Third month:** Sex organs appear
- Fourth month:** Rapid growth, red blood cells, white blood cells; active sucking
- Fifth month:** Hears sound, sleeps, 10 to 12 inches long, 1 pound
- Sixth month:** Rapid growth, 12 to 14 inches long, 2 pounds
- Seventh month:** Growth slows, viability attained
- Eighth and ninth months:** Preparation for birth; senses ready to function, brain is 25 percent of adult weight

At the end of the ninth month, the fetus (just before birth) is about 20 inches long; it weighs about 7 pounds, 6 ounces; and its brain at birth is 20 to 25 percent of its adult weight. Table 4.1 summarizes the course of prenatal development.



An Informed View

These essays highlight controversial issues, challenging you to give your opinion after you have studied the facts.

Key Terms

This represents a list of those terms that are essential to understanding the ideas and suggestions of that chapter.

What Do You Think?

This series of questions challenges you to demonstrate your knowledge of the chapter's content, not only by applying the material to different situations but also by asking you to be creative in answering the question or solving the problem.

Chapter Review Test

Use this end-of-chapter test to check your understanding of the chapter's key points.

Conclusion & Summary

Following a brief summary of the chapter's main themes, a detailed set of summary statements helps you to review the chapter quickly and thoroughly.

chapter 1 The Biological Basis of Development 79

Crick, Dugan, R. (1995). *The gene wars: Science, politics, and the human genome*. New York: Norton. You will find this an excellent, readable account of the Human Genome Project. The personal histories are especially appealing.

Psychological impact. Is there any stigma attached because of a person's genetic makeup?

Genetic testing. If there's a specific family history of a disorder, what is the role of genetic testing? How should people be informed about their predisposition to disease? (Patenaude, Guttmacher, & Collins, 2002).

Reproductive issues. What role does genetic information play in decision making and reproductive rights?

Clinical issues. What type of and how much education are necessary for health care providers? What are desirable standards and quality control measures?

Commercialization. Who controls property rights and accessibility of data?

Finally, a good way to summarize our work in this chapter is to remember that the outcome of genetic action can only result from its interaction with environmental experiences.

Guided Review

16. _____ first made us aware of dominant and recessive characteristics.

17. When several genes contribute to a trait, this is called _____ inheritance.

18. Down syndrome is perhaps the best-known _____ disorder.

19. _____, _____, and _____ are examples of genetic disorders.

20. Mapping the human genes is the goal of the _____.

21. The results of the latest genetic research reinforce the belief that development is explained by the _____ of genes and the environment.

CONCLUSION & SUMMARY

In this chapter we explored the biological basis of our uniqueness. We considered not only the power and beauty of nature in establishing our genetic endowment but also the growing influence of technology. The genes the mother and father provide unite to produce a new and different human being, yet this new life still shows many of the characteristics of both parents. We saw how this newness and sameness have challenged researchers for decades.

Beginning with the discoveries of Mendel and still continuing, the secrets of hereditary transmission remain at the forefront of scientific endeavor, especially given the impact of the Human Genome Project. Today's work, building on our knowledge of DNA, provides hope for the future while simultaneously raising legal and ethical questions that have yet to be resolved.

How does fertilization both "nature of and external" occur?

- Knowledge of hormonal control of the menstrual cycle is crucial for understanding fertilization.
- The study of twins, especially monozygotic twins, has long fascinated psychologists.
- The increasing number of infertile couples has led to a growing demand for external fertilization.
- The most widely used external fertilization technique is AID (artificial insemination by donor).

The success rate of external fertilization procedures has improved with increasing knowledge.

Today's adoption procedures include both closed and open adoption.

What are the mechanisms of heredity, and what could go wrong?

- Mitosis and meiosis are the means of cell division.
- DNA is the chemical key to life.
- Understanding how traits are transmitted requires a knowledge of the workings of dominant and recessive genes.

Answers

16. Mendel in 1865
17. polygenic
18. chromosomal
19. sickle-cell anemia, cystic fibrosis, and Tay-Sachs
20. the Human Genome Project
21. the interaction

HO part 2 Beginnings

Chromosomal defects include Down syndrome, Klinefelter syndrome, and Turner syndrome.

Genetic defects include Tay-Sachs, sickle-cell anemia, cystic fibrosis, and phenylketonuria and spina bifida.

What are the major features and anticipated uses of the Human Genome Project?

The Human Genome Project is an endeavor to map all of the genes.

HGP will have major implications for the identification, prevention, and medication of disease.

Ethical, legal, and social issues require resolution in the light of new discoveries.

KEY TERMS

Alleles	Genotype	Open adoption
Blastocyst	Hemophilia	Ovulation
Closed adoption	Heterozygous	Phenotype
Cystic fibrosis (CF)	Homozygous	Phenylketonuria (PKU)
Cytogenetics	Human Genome Project	Polygenic inheritance
Dizygotic	Implantation	Recessive
DNA (deoxyribonucleic acid)	In vitro fertilization	Sex-linked inheritance
Dominant	Klinefelter syndrome	Sickle-cell anemia
Down syndrome	Meiosis	Spina bifida
Endometriosis	Mitosis	Turner syndrome
Fallopian tubes	Monozygotic	Zygote
Fragile X syndrome	Mutations	

WHAT DO YOU THINK?

1. Several controversies have occurred lately about surrogate mothers and the children they bear. Do you have any strong feelings about surrogacy? Can you defend it? Regardless of your personal feelings, can you present what you see as the pros and cons of surrogacy?

2. In your reading, perhaps you noticed that the process of in vitro fertilization depended on research findings from studies of the menstrual cycle. Can you explain this, paying particular attention to the administering of hormones and the timing of their administration?

3. James Watson and Francis Crick received a Nobel Prize for their discovery of the double-helix structure of DNA. Why is the discovery of DNA so important in our lives? Can you think of anything you have read about in the newspapers or seen on television that derives from this discovery?

CHAPTER REVIEW TEST

1. From ovulation to implantation takes about _____.

a. seven days
b. two weeks
c. one month
d. nine months

2. The union of sperm and egg is a process known as _____.

a. mitosis
b. fertilization
c. meiosis
d. mutation

3. In vitro fertilization takes place _____.

a. in the fallopian tube
b. in the uterus
c. outside the woman's body
d. in the ovary

4. Which of the following is not a female secondary sex characteristic?

a. higher voice
b. wider hips
c. breasts
d. thick hair

5. The process by which eggs are ripened and released is called _____.

a. ovulation
b. mitosis
c. fertilization
d. implantation

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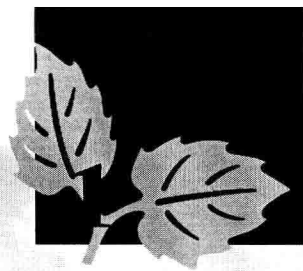
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Lifespan Psychology: An Introduction

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The year was 1955.

During those 365 days, the psychologists Emmy Werner and Ruth Smith (1992) began to collect data on every child born on the island of Kauai, a part of the Hawaiian chain. That year a total of 837 children were born.

Amazingly, Werner and Smith studied 505 of these children from their prenatal days until they were in their early thirties. (The drop in the number of children studied was due to some of the children dying, some moving to other islands, and some moving to the U.S. mainland.)

Of these 505 children, one in three was born with the threat of serious developmental difficulties, such as the effects of a difficult birth or an environment that triggered formidable challenges. Some faced the prospect of a life of grinding poverty. Others experienced divorce, desertion, alcoholism, or mental illness.

Two out of three children in this vulnerable group were exposed to four or more of these risk factors. And yet, one in three of these high-risk children developed into a confident, competent young adult.

How can we explain this phenomenon? What developmental forces were at work that enabled certain children to overcome dramatically difficult obstacles, and yet permitted others to succumb? In a sense, the children of Kauai provide us with a window through which we can view the events that shape the lifespan, the biological, psychological, and environmental interactions that make us what we are. 🍀

The encouraging story of the children of Kauai testifies to the remarkable changes that occur in the course of the lifespan. But much more is hidden in the chronicle of these lives. What combination of biological, psychological, and environmental forces inter-



Emmy Werner's studies have provided invaluable insights into the characteristics of resilient children.

acted at what levels to produce these differences? What were the processes at work that *explain* what happened? These are the questions that will guide our work together as we explore the mysteries of the lifespan.

With these ideas in mind, then, we'll first explore the meaning of lifespan development and follow the developmental path of a distinguished individual. We'll then attempt to indicate its importance to you by illustrating how peaks and valleys come into all of our lives. Although we all chart an individual course, we can still identify many similarities in our lives. We walk, we talk, we attend school, and we search for a satisfying career. Yet within this sameness, we all have and choose different experiences that shine a unique light on our journey through the lifespan. To aid in this analysis of lifespan development, we'll introduce the notion of biopsychosocial interactions, those forces that act together to shape the path of development. This, in turn, leads to a consideration of several issues that must be addressed in any scrutiny of lifespan development. Finally, we'll complete this introduction by analyzing pertinent research techniques used in studies of human development.

Studying lifespan development should provide you with insights into your own behavior and the behavior of others, leading to better personal and professional relationships with those around you (Strough, Berg, & Sansone, 1996). To help you fulfill this objective, we have included *What's Your View? A Sociocultural View*, and *Applied View* boxes.

Chapter Objectives

After you read this chapter, you should be able to answer the following questions.

- **How would you define and describe lifespan development?**
- **What are the different views of lifespan development?**
- **What role do biopsychosocial interactions play in lifespan development?**
- **What are the major issues in lifespan development?**
- **What is the role of research in studying lifespan development?**

AN EXAMPLE OF DEVELOPMENT THROUGH THE LIFESPAN

If you think about your own life—starting school, perhaps going off to college, beginning a job, getting married, having a child—you begin to appreciate the complexity of development. Since it's usually difficult to look at ourselves objectively, let's examine the life of an outstanding individual—Colin Powell—whose rise to fame and power with all its accompanying triumphs and tragedies offers an insightful view into what is meant by *lifespan development*.

Colin Powell—An Amazing Journey

Colin Power, whom America came to know quite well as Chairman of the Joint Chiefs of Staff, was born in Harlem on April 5, 1937, the son of Jamaican immigrant parents. He gained confidence and self-esteem from the care, love, and attention that he received from his family. His parents valued education and he quickly realized the importance of learning. As a young African American, Powell decided that opportunities were greater in the army than in the corporate world.

A product of the ROTC program at the City College of New York, Powell soon demonstrated those leadership qualities that would mark him as an outstanding soldier. In 1963, as a second lieutenant and newly married, Powell was sent to Vietnam. Wounded in action there, he showed the bravery and the compassion for his colleagues that have been constant themes in his career. Returning to the United States, he obtained a master's degree in business administration and in 1972 was selected as a White House Fellow.