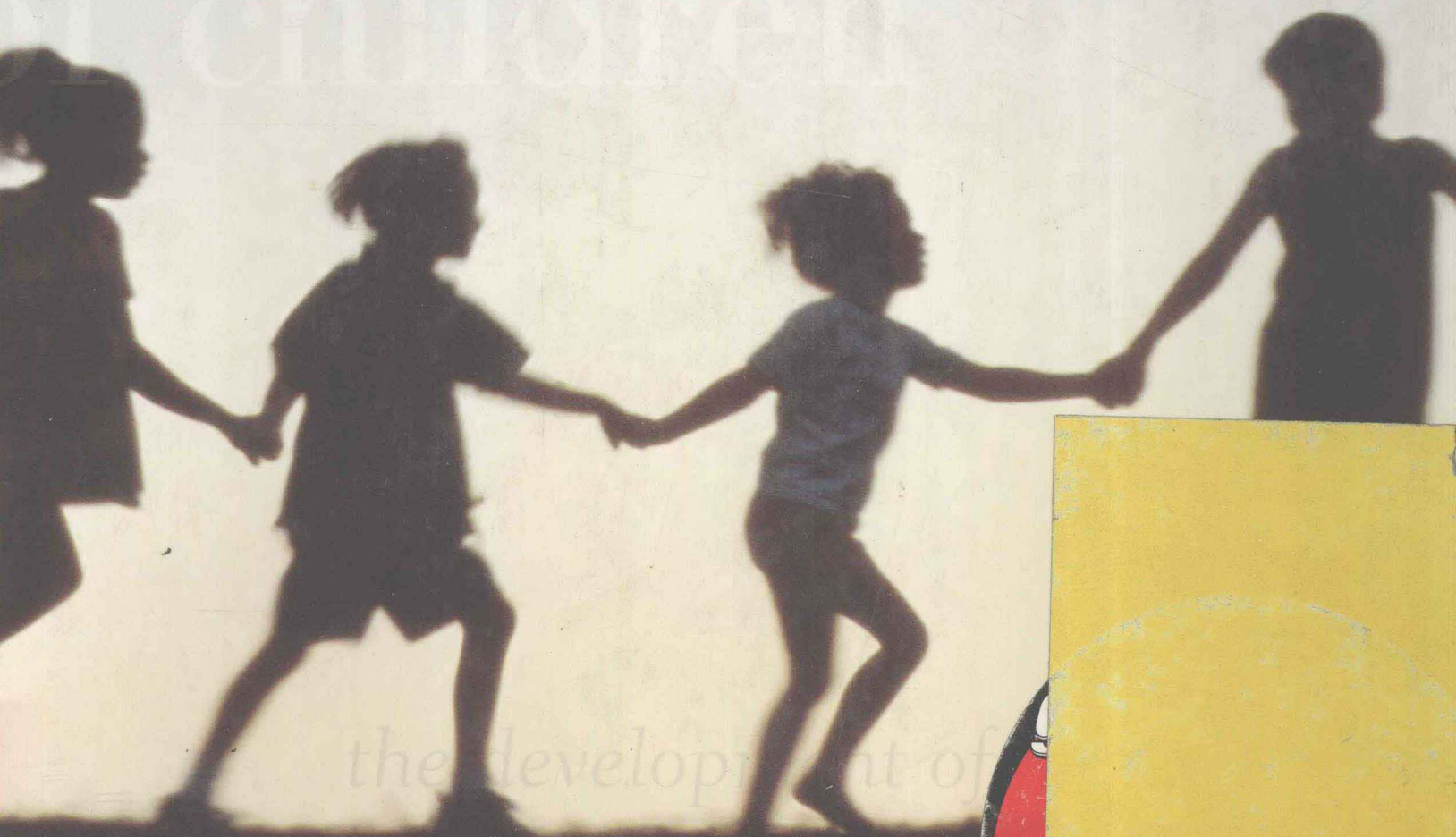


# the development of children

michael cole

sheila r. cole



fourth edition



# The Development of Children



FOURTH EDITION

Michael Cole

*University of California, San Diego*

Sheila R. Cole

WORTH PUBLISHERS

**The Development of Children**, Fourth edition

Copyright © 2001, 1996, 1993, 1989 by Michael Cole and Sheila R. Cole

All rights reserved

Manufactured in the United States of America

ISBN: 0-7167-3833-3

Printing: 1 2 3 4 04 03 02 01

Sponsoring Editor: Jessica Bayne

Development Editor: Peter Deane

Project Editor: Margaret Comaskey

Production Manager: Barbara Anne Seixas

Art Director/Cover Design: Barbara Reingold

Cover Photograph: Marks Productions/Image Bank

Designer: Paul Lacy

Illustration Coordinator: Lou Capaldo

Illustrations: Chris Notarile, Fineline Inc., Tomo Narashima

Photo Research: Elyse Rieder, Vikii Wong

Composition: Progressive Information Technologies

Printing and Binding: R. R. Donnelley & Sons Company

#### **Library of Congress Cataloging-in-Publication Data**

Cole, Michael, 1938-

The development of children / Michael Cole, Sheila R. Cole.—4th ed.

p. cm.

Includes bibliographical references and indexes.

ISBN 0-7167-3833-3

1. Child development. I. Cole, Sheila. II. Title.

RJ131.C585 2000

305.231—dc21

99-087966

Illustration credits begin on page IC-1 and constitute an extension of the copyright page.

#### **Worth Publishers**

41 Madison Avenue

New York, NY 10010

<http://www.worthpublishers.com>

# Preface

The task of writing a textbook to introduce students to the topic of human development poses a special challenge. On the one hand, everyone who opens such a book has had extensive firsthand experience with the process of growing up. In addition, each reader has had many opportunities to witness and to think about the development of other people who are older, the same age, and younger. So, in one sense at least, readers are already experts on the topic of human development. On the other hand, their expertise is subjective, intuitive, and, correspondingly, relatively narrow in scope.

The challenge, and our goal, in writing this book has been to show students that a broad scientific framework for understanding children's development can enrich their understanding of their own lives and of the processes of development in general. Our greatest aspiration is to bring intellectual excitement to their learning about human development so that the research and theorizing we write about will guide the practical applications of scientific knowledge for students who will become parents and practitioners.

In our view, development is best understood as a fusion of biological, social, and psychological processes interacting in the unique medium of human culture. We have tried to show, not only the role each of these factors considered separately, but also how they interact in diverse cultural contexts to create whole, unique, human beings. Development also consists of transformations that take place over time, and in our view it is best examined and described chronologically. We begin our presentation with the phenomenon of conception and trace the sequence of developmental changes from that instant into infancy, childhood, and adolescence.

Throughout, we have been guided by the belief that it is a mistake to make sharp distinctions between practical, theoretical, and research orientations in studying development. Truly fundamental knowledge must draw on and illuminate all three orientations.

## A PRACTICAL ORIENTATION

The authors of *The Development of Children* have known each other since adolescence. We have shared a personal interest in children's development from the time we were teenagers, first as camp counselors working with young children, then as parents raising children of our own, and now as grandparents, regularly called upon to play the role. We each have a deep professional interest in child development, as well. Michael Cole is a specialist in the study of children's learning and cognitive development. Sheila Cole is a journalist who has written articles about children and books for children.

Both personally and professionally, we are actively interested in discovering practical approaches for fostering the development of children. So it is natural that our book should focus continually on issues such as the benefits of special nutrition programs for children who have experienced malnutrition early in life; methods for assessing the quality of out-of-home care for young children; the

importance of extended families in ameliorating the problems facing poor children; the challenges of learning to read and to do arithmetic in school; ways to foster emotional self-regulation and reduce aggression among children; the special hazards of teenage pregnancy; and effective means of parenting teenagers. We also include many examples drawn from the everyday lives of children to show how a society's beliefs influence its children's development by shaping both the laws and the social norms that govern child-rearing practices.

## A THEORETICAL ORIENTATION

There is much truth to the saying that nothing is so practical as a good theory. A deep understanding of how children develop requires familiarity not only with the everyday lives of children but also with theories that provide coherent interpretations of the facts derived from scientific research. Such understanding is an essential foundation for attempts to create and guide practical courses of action.

A major difficulty for students of child development is the number and diversity of theories that compete to provide an understanding of basic issues and phenomena. We have adopted two strategies to deal with this problem. First, we frame our presentation in terms of the enduring issues that all theories of development must resolve: how biological and environmental contributions (nature and nurture) are woven together; the extent to which the interaction of these factors results in continuities and discontinuities in the dynamic process of development; and the reasons for the individual differences among people. Second, we present competing theories in a constant dialogue with one another, with data from contemporary research, and with the practical issues the theories were designed to address. Rather than gloss over differences among theories, we have attempted to build an appreciation of the bases for the competing interpretations the theories offer. Then we have tried to move beyond the differences to show how each theory contributes to an overall understanding of development.

## A RESEARCH ORIENTATION

The dialogue between theory and practice leads naturally to disputes about the facts of development as well as about the methodologies used to marshal facts in support of one perspective or another. Therefore it is essential that students understand research methods both as a means of judging the merits of the evidence that psychologists and other developmentalists gather and as a means of thinking critically about the conclusions they draw. What is the evidence that sparing the rod spoils the child? How might we determine whether the differences between boys' and girls' games result from social forces or from deep-seated biological predispositions? Are the links that have been found between watching violent programs on television and subsequent aggressive behavior necessarily causal? And why is it so difficult for developmentalists to answer enduring questions about development once and for all? Only through an awareness of the logic, methods, and, indeed, the shortcomings of developmental research can students come away from a course on development with the ability to evaluate for themselves the relative merits of different scientists' conclusions.

The kind of critical thinking students need to evaluate evidence and to appreciate the process of research does not develop spontaneously. It requires careful explanation and repeated exposure. Consequently, we have made detailed and probing discussions of relevant research a constant feature of the book.



## A FOCUS ON CULTURE

Over the years, our work has taken us to live in many parts of the world: West Africa, Mexico, Russia, Israel, Japan, and Great Britain. Within the United States, we have lived and worked in affluent suburbs and inner-city ghettos. Often our children have accompanied us, providing us with even richer opportunities for getting to know children in a wide variety of circumstances. Such experiences have led us to believe that culture is a fundamental constituent of any comprehensive theory of development.

For students to appreciate this truth fully, it is necessary for them to overcome as much as possible any ethnocentrism they may have in their view of children's development. The task is by no means an easy one. For many Americans, the initial reaction to daily life in an African village, an Asian metropolis, or the impoverished neighborhoods of a large U.S. city is likely to be "culture shock," a sense of disorientation that stems from the difficulty of understanding the way of life of people in other cultures or foreign circumstances. Very often, culture shock is accompanied by a sense of cultural superiority; the way "we" do it (prepare our food, build our houses, care for our children) seems superior to the way "they" do it. In addition, appreciation of culture's contribution to development requires more than attention to the ways people far away raise their children. Culture is fundamental to children's experience in any society—not something added on to the process of development, but an essential part of that process.

Recognizing how difficult it is to think objectively about the nature of development in unfamiliar cultures, we have tried to keep our readers constantly aware of the diversity of the cultural contexts in which children grow up and of the variations that exist in human child-rearing practices. Only by considering their culture as but one alternative design among many designs for living can students arrive at a valid understanding of the principles that guide the development of all human beings.

## A FOCUS ON BIOLOGY

It may seem surprising that authors who profess a special interest in culture would simultaneously underscore, as we do, the importance of biological factors to human development. Often the two sources of human variability are discussed as opposing each other, as if somehow, by virtue of living within a culture, human beings ceased to be biologically evolving creatures. However, modern research on development has shown this to be a false opposition. Not only is the ability to create and use culture one of the most striking biological facts about our species, but there would be no development at all without biological maturation. Advances in the biological sciences have profoundly influenced human development through improved health care and advanced medical procedures. In addition, the biological sciences have increased our understanding of development by shedding light on critical issues such as the intimate links between biological changes in the brain and changes in children's cognitive capacities. The importance of the biological domain in development is made clear throughout this book.

## A FOCUS ON THE DYNAMIC INTERACTION OF DOMAINS

*The Development of Children* combines traditional chronological and topical approaches to development in a deliberate attempt to make as clear as possible the idea that development is a process involving the whole child

in a dynamically changing set of cultural contexts. Although the book is chronological in its overall structure, and adopts traditional stage boundaries for each of its major sections, the organization of the text is also topical in two respects. First, within broad, conventionally defined stages, it describes developments as occurring in the biological domain, the social domain, or the psychological domain (including emotion and cognition), while at the same time tracing the ways in which these developments interweave with development in other domains. Second, it focuses on the way stagelike changes emerge from the convergence of events in the various developmental domains.

Chronological and topical perspectives correspond to the warp and the woof of development. The pattern that is woven from their combination is the story of development. It is that story we have attempted to tell in this book.

## NEW TO THE FOURTH EDITION

It has been almost 20 years since we undertook the first edition of this book. Over that period of time there has been a constantly increasing stream of scientific research that has made each revision a real challenge. Some topics that were of central interest to developmentalists have receded from the spotlight to be replaced by new and exciting findings. For example, 20 years ago research on middle childhood was particularly dominant, while both infancy and adolescence were relatively neglected areas of research. Today the study of infancy and adolescence draw the lion's share of interest.

In attempting to ensure that the presentation in this edition is as up to date as possible, we have carefully documented major new developments in the field as the 700 or more new references attest. We have also used the vantage point of our long experience in surveying the field to weed out research that, while authoritative in earlier decades, has been superseded owing to more powerful methods or new theoretical insights that have rendered earlier approaches less interesting.

Readers familiar with the third edition will find that each of the distinctive features of earlier editions has been built upon, streamlined, and better integrated. These include

- **Additions to our already extensive discussions of practical issues.** These include discussions of genetic counseling, the consequences of maternal depression, the controversy over day care, the problem of bullying, organizing classrooms to take advantage of children's home cultures, childhood obesity and adolescent eating disorders, learning disabilities, the use of computers in schools, adolescent risk taking, the creation of special rituals to promote ethnic identity formation, and many other topics of current concern.
- **A special focus on linking theory and practice.** Throughout the text, applications of developmental research are closely linked to their research base. In addition, the Epilogue specifically addresses the many ways in which the principles and scientific knowledge of developmental study can be used as a guide to everyday practice.
- **Increased attention to linkages among the social, emotional, and cognitive developmental events from which the whole child emerges.** In this edition we have devoted additional attention to examining how changes in social, biological, emotional, and cognitive domains occur as part of a single life process.
- **Increased treatment of key traditional topics.** Continuing a trend already in evidence in the third edition, we have expanded our coverage

of several traditional topics, including perceptual, socioemotional, and physical development, gender and ethnic identity formation, and post-Piagetian approaches to cognitive development.

- **Valuing diversity.** Like its predecessors, this edition of *The Development of Children* places special emphasis on the importance of understanding and appreciating the diversity of development as it occurs in many parts of the world and among different populations within North America. We are gratified that concern with cultural diversity has found a growing place in the study of child development, but we believe the urgency of understanding and appreciating the role of diversity in human development is greater today than ever before. The fourth edition reflects this increased concern.
- **Accessibility.** In preparing this edition we have made a special effort to increase the accessibility of our presentation without reducing its rigor. Every discussion, holdover and new alike, has been closely scrutinized with an eye to streamlining, sharpening focus, and making the linkages among key points more apparent. It is an effort from which, we think, students of all levels of ability will benefit.

## A NOTE TO INSTRUCTORS

*The Development of Children* has been designed to be taught within either a quarter or a semester system. For classes taught on the quarter system in which the curriculum is restricted to childhood, the final section of the book can be left to students to read or not, as they choose, and the remainder can be fitted comfortably into a 10-week course. For 10-week courses that include adolescence, sections rather than whole chapters in Part I can be read; Chapter 7 (on the way infant experience shapes later development) and Chapter 8 (on language) could also be skipped or assigned selectively without disrupting the general flow of the presentation.

Instructors who prefer to organize this course in a topical fashion may also wish to assign segments rather than entire chapters in Part I: these chapters present important foundational issues that can be explored to any depth that is deemed appropriate. Chapters 4 through 6 can be read in sequence, or topical issues from each can be abstracted for reading in connection with corresponding chapters in Parts III, IV, and V. The natural sequence of chapters for the remainder of the course then becomes 9, 12, 13, and 16, which emphasize cognitive development, and 10, 14, and 15, which emphasize social and personality development. Instructors planning to use this textbook in conjunction with a topical course will find it helpful to turn to the Appendix on page A-1, "Guide to Discussions of Specific Aspects of Development."

## SUPPLEMENTS

An extensive package of supplements has been prepared, each corresponding to the fourth edition of *The Development of Children* in content, level, and organization.

## READINGS ON THE DEVELOPMENT OF CHILDREN, THIRD EDITION

This reader, by Mary Gauvain, University of California at Riverside, and Michael Cole, is newly updated for this edition of the text and includes seventeen new articles.



## INSTRUCTOR'S RESOURCE MANUAL

The *Instructor's Resource Manual* by Jennifer Coots, University of California at Long Beach, features chapter-by-chapter previews and lecture guides, learning objectives, topics for discussion and debate, handouts for student projects, and supplementary readings from journals. Course planning suggestions and ideas for term projects are also included.

## STUDY GUIDE

The carefully crafted *Study Guide* by Stephanie Stolarz-Fantino, University of California at San Diego, helps students to read and retain the text material at a higher level than they are likely to achieve by reading the text alone. Each chapter includes a variety of practice tests and exercises to help integrate themes that reappear in various chapters. Each chapter also includes a review of key concepts, guided study questions, and section reviews that encourage students' active participation in the learning process.

## TEST BANK

Thoroughly revised, the *Test Bank* by Jennifer Coots, University of California at Long Beach, includes approximately 60 multiple-choice and 70 fill-in, true-false, matching, and essay questions for every chapter. Each question is keyed to the textbook by topic, page number, and level of difficulty.

## COMPUTERIZED TEST BANK CD-ROM

This computerized test bank CD-ROM, on dual platform for Windows and Macintosh, offers an easy-to-use test-generation system, allowing instructors to select specific questions, generate a random assortment from one or more chapters, and even add questions to the system. The CD-ROM is also the access point for online testing.

## ONLINE TESTING

Diploma is a program from the Brownstone Research Group that allows you to create and administer examinations on paper, over a network, and now, over the Internet. You will also be able to incorporate multimedia, graphics, movies, sound, or interactive activities within the questions. Security features allow you to restrict tests to specific computers or time blocks. The package also includes an impressive suite of grade book and question-analysis features.

## TRANSPARENCY SET

A set of 50 full-color transparencies offers key illustrations, charts, graphs, and tables from the textbook.

## COLE COMPANION WEB SITE

The *Cole and Cole Companion Web Site* at [www.worthpublishers.com/coledevelopmentofchildren4e](http://www.worthpublishers.com/coledevelopmentofchildren4e) offers a variety of simulations, tutorials, and study aids organized by chapter with periodic updates (that is, new Web links, exercises, and new developments in developmental psychology). In addition to the on-line testing, syllabus posting, and Web site building services, the *Companion Web Site* offers the following features:

- **Psychology Updates:** *Psychology in the News* updates instructors and students about current events and research in developmental psychology.

- **Web Links:** Over 150 annotated Web links related to the study of developmental psychology are organized by chapter.
- **Online Quizzes:** Instructors can easily and securely quiz students online. The site features prewritten, multiple-choice quizzes for each of the book's chapters (not from the test bank). Students receive instant feedback and can take the quizzes multiple times. Answers are stored and instructors can view results by quiz, student, or question, or can get weekly results via email.
- **Interactive Animations:** Animations of psychological processes are based on the text art and include a quizzing function.
- **Flashcards:** Interactive flashcards tutor students on all chapter/text terminology and allow them to then quiz themselves on the terms.

### IMAGE AND LECTURE GALLERY

Worth's *Image and Lecture Gallery* at [www.worthpublishers.com/ILG](http://www.worthpublishers.com/ILG) provides access to electronic versions of lecture materials. Registered users can browse, search, and download illustrations from Worth titles and prebuilt PowerPoint presentation files for specific chapters, containing all chapter art or all chapter section headings in text form. Users can also create personal folders on a personalized home page for easy organization of the materials.

### WEBCT AND BLACKBOARD ONLINE ARCHITECTURE

With WebCT "architecture," instructors can create a course Web site and/or online course, with content, threaded discussions, quizzing, an online gradebook, course calendar, and more! We have placed *The Development of Children, Fourth Edition* graphic and media content in the WebCT format. Worth Publishers is happy to provide instructors with Cole/Cole content for Blackboard architecture as well.

### JOURNEY THROUGH CHILDHOOD DEVELOPMENTAL PSYCHOLOGY VIDEO SERIES

Designed for both in-class demonstration and at-home viewing, these two videos with accompanying student/instructor workbooks will enable development students to observe the activities, responses, and behaviors of children of various ages and ethnicities in a variety of naturalistic environments—including school, home, day-care, and health-care settings. The videos include interviews with noted researchers and child development experts, including Patricia Greenfield, Barbara Rogoff, and Gilda Morelli. The instructor's observation guide offers teaching and activity suggestions, while the student observation guide directs students on observational skills and links between segments.

### THE SCIENTIFIC AMERICAN FRONTIERS VIDEO COLLECTION FOR DEVELOPMENTAL PSYCHOLOGY

This renowned collection is comprised of seventeen video segments of approximately 15 minutes each covering topics ranging from language development to nature–nurture issues. The videos can be used to launch classroom lectures or to emphasize and clarify course material. The accompanying *Faculty Guide* by Richard O. Straub, University of Michigan, describes and relates each segment to specific topics in *The Development of Children, Fourth Edition*.

## ACKNOWLEDGMENTS

A book of this scope and complexity could not be produced without the help of others. A great many people gave generously of their time and experience to deepen our treatment of various areas of development, particularly the many scholars who consented to review drafts of our manuscript and make suggestions for improvement. The remaining imperfections exist despite their best efforts.

For the foundations laid in earlier editions, we gratefully acknowledge the help of **Curt Acredolo**, University of California, Davis; **Karen Adolph**, Carnegie Mellon University; **Margarita Azmitia**, University of California, Santa Cruz; **MaryAnn Baenninger**, Trenton State College; **Ann E. Bigelow**, St. Francis Xavier University; **Gay L. Bisanz**, University of Alberta, Edmonton; **Jeffrey Bisanz**, University of Alberta; **Kathryn N. Black**, Purdue University; **Patricia C. Broderick**, Villanova University; **Urie Bronfenbrenner**, Cornell University; **Gordon Bronson**, University of California, Berkeley; **Ann L. Brown**, University of California, Berkeley; **Michaelanthony Brown-Cheatham**, San Diego State University; **Angela Buchanan**, De Anza College; **Tara C. Callaghan**, St. Francis Xavier University; **Richard Canfield**, Cornell University; **William B. Carey**, Children's Hospital of Philadelphia; **Robbie Case**, OISE; **David B. Conner**, Northeast Missouri State University; **Andrew C. Coyne**, Ohio State University; **William E. Cross, Jr.**, Cornell University; **Frank Curcio**, Boston University; **David M. Day**, University of Toronto; **Anthony De Casper**, University of North Carolina, Greensboro; **Judy S. DeLoache**, University of Illinois at Urbana-Champaign; **Cathy Dent-Read**, University of California, Irvine; **Don Devers**, North Virginia Community College, Annandale; **Rosanne K. Dlugosz**, Scottsdale Community College; **Rebecca Eder**, University of California, Davis; **Gregory T. Eells**, Oklahoma State University; **Peter Eimas**, Brown University; **Jeffrey W. Elias**, Texas Tech University; **Beverly Fagot**, University of Oregon; **Sylvia Farnham-Diggory**, University of Delaware; **David H. Feldman**, Tufts University; **Mark Feldmen**, Stanford University; **Kurt Fischer**, Harvard University; **Brenda K. Fleming**, Family Service Agency, Phoenix; **Herbert P. Ginsburg**, Teachers College, Columbia University; **Sam Glucksberg**, Princeton University; **Kathleen S. Gorman**, University of Vermont; **Mark Grabe**, University of North Dakota; **Steve Greene**, Princeton University; **Harold D. Grotevant**, University of Minnesota; **William S. Hall**, University of Maryland, College Park; **Paul Harris**, University of Oxford; **Janis E. Jacobs**, University of Nebraska, Lincoln; **Jeannette L. Johnson**, University of Maryland, College Park; **Daniel P. Keating**, Ontario Institute for Studies in Education; **Claire Kopp**, University of California, Los Angeles; **Gisela Labouvie-Vief**, Wayne State University; **Alan W. Lanning**, College of DuPage; **Kathleen L. Lemanek**, University of Kansas; **Jacqueline Lerner**, Michigan State University; **Elizabeth Levin**, Laurentian University; **Zella Luria**, Tufts University; **Sandra Machida**, California State University, Chico; **Jean Mandler**, University of California, San Diego; **Sarah Mangelsdorf**, University of Illinois at Urbana-Champaign; **Michael Maratsos**, University of Minnesota; **Patricia H. Miller**, University of Florida; **Shitala P. Mishra**, University of Arizona; **Joan Moyer**, Arizona State University; **Frank B. Murray**, University of Delaware; **Sharon Nelson-LeGall**, University of Pittsburgh; **Nora Newcombe**, Temple University; **Ageliki Nicolopoulou**, Smith College; **Elizabeth Pemberton**, University of Delaware; **Herbert L. Pick, Jr.**, University of Minnesota; **Ellen F. Potter**, University of South Carolina, Columbia; **David E. Powley**, University of Mobile; **Thomas M. Randall**, Rhode Island College; **LeRoy P. Richardson**, Montgomery County Community College; **Christine M. Roberts**, University of Connecticut; **Barbara Rogoff**, University of California, Santa Cruz; **Marnie Roosevelt**, Santa Monica Community College; **Karl Rosengren**, University of Illinois at Urbana-Champaign; **Carolyn Saarni**,

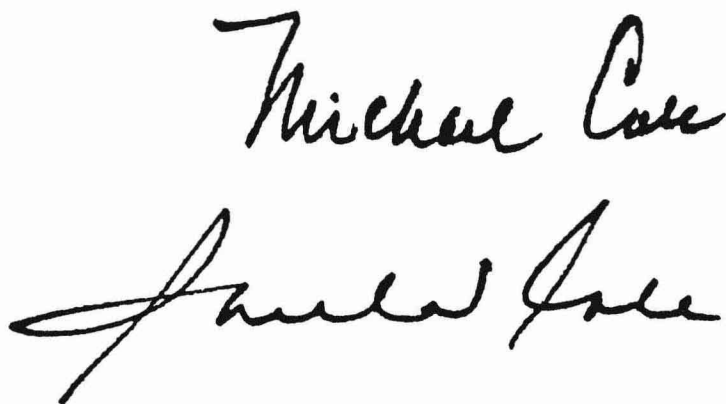
Sonoma State University; **Arnold Sameroff**, University of Michigan; **Sylvia Scribner**, City University of New York; **Felícísima C. Seráfica**, Ohio State University; **Robert S. Siegler**, Carnegie Mellon University; **Jerome L. Singer**, Yale University; **Elizabeth Spelke**, Cornell University; **Catherine Sophon**, University of Hawaii at Manoa; **Doreen Steg**, Drexel University; **Stephanie Stolarz-Fantino**, San Diego State University; **Evelyn Thoman**, University of Connecticut; **Michael Tomasello**, Emory University; **Katherine Van Giffen**, California State University, Long Beach; **Terrie Varga**, Oklahoma State University; **Billy E. Vaughn**, California School of Professional Psychology, San Diego; **Lawrence J. Walker**, University of British Columbia; **Harriet S. Waters**, State University of New York at Stony Brook; **Nanci Weinberger**, Bryant College; **Thomas S. Weisner**, University of California, Los Angeles; **Patricia E. Worden**, California State University at San Marcos; **Phillip Sanford Zeskind**, Virginia Polytechnic University; **Patricia Zukow-Goldring**, University of California, Irvine.

**Paul Baltes** (Max Planck Institute for Human Development, Berlin), **Joe Campos** (University of California, Berkeley), **Robbie Case** (Stanford University), **Carol Izard** (University of Delaware), and **Larry Nucci** (University of Illinois, Chicago) merit special thanks for providing us with valuable illustrative material and special advice for our various editions.

For the fourth edition, we thank **Mike Anderson**, The University of Western Australia; **Jeremy M. Anglin**, University of Waterloo; **Janet Wilke Astington**, University of Toronto; **Ruth Ault**, Davidson College; **Simon Baron-Cohen**, University of Cambridge; **Bill Barowy**, Lesley College; **Elizabeth Bates**, University of California, San Diego; **Richard Beach**, University of Minnesota; **Ann Benjamin**, University of Massachusetts, Lowell; **Marc Bornstein**, National Institutes of Health; **Sandra Leane Bosacki**, University of Toronto; **Mary Bryson**, University of British Columbia; **David W. Carroll**, University of Wisconsin, Superior; **P. Lindsay Chase-Lansdale**, University of Chicago; **Paul Cobb**, Vanderbilt University; **Leslie B. Cohen**, University of Texas; **Jennifer Coots**, University of California, Long Beach; **Brian Cox**, Hofstra University; **Charles Crook**, Loughborough University; **James L. Dannemiller**, University of Wisconsin; **Pierre R. Dasen**, University of Geneva; **Natacha M. De Genna**, Concordia University; **Adele Diamond**, Eunice Kennedy Shriver Center; **Timothy Dickel**, Creighton University; **Carol Dweck**, Columbia University; **Shari Ellis**, University of Florida; **William Fabricus**, Arizona State University; **Jo Ann Farver**, University of Southern California; **Tiffany Field**, Nova Southeastern University; **Robyn Fivush**, Emory University; **Constance Flanagan**, Pennsylvania State University; **Peter Fonagy**, University College, London; **Elice Forman**, University of Pittsburgh; **Eugene E. Garcia**, University of California, Berkeley; **Janet Gates**, Geneva College; **Brenda O. Gilbert**, Southern Illinois University; **Mary Gauvain**, University of California, Riverside; **Katherine Goff**, University of Colorado at Denver; **Roberta Golinkoff**, University of Delaware; **Artin Goncu**, University of Illinois at Chicago; **Alison Gopnik**, University of California, Berkeley; **Sandra Graham-Bermann**, University of Michigan; **Koeno Gravemeijer**, The Freudenthal Institute; **Patricia Greenfield**, University of California, Los Angeles; **Christine Happle**, University of Bern; **Catherine L. Harris**, Boston University; **Susan Harter**, University of Denver; **Sara Harkness**, University of Connecticut; **Gail Heyman**, University of California, San Diego; **Carolee Howes**, University of California, Los Angeles; **Fergus Hughes**, University of Wisconsin, Green Bay; **Michael Hughes**, University of California, San Diego; **Kedmon Hungwe**, University of Zimbabwe; **Yo Jackson**, University of Kansas; **Barbara Kisilevsky**, Queens University; **Grazyna Kochanska**, University of Iowa; **Gary W. Ladd**, University of Illinois; **Ann L. Law**, Rider University; **Jay L. Lemke**, City University of New York; **Michael Lewis**, Robert Wood Johnson Medical School; **Lynn S. Libern**, Pennsylvania State University; **Cynthia Lightfoot**, Pennsylvania State University; **Lewis Lipsitt**, Brown University; **Marguerite Malakoff**, Harvey Mudd College; **Guiseppe**

**Mantovani**, University of Padova; **Ann McGillicuddy-DeLisi**, Lafayette College; **Shirley McGuire**, University of California, San Diego; **Bud Mehan**, University of California, San Diego; **Andrew Meltzoff**, University of Washington; **Luis C. Moll**, University of Arizona; **Gilda Morelli**, Boston College; **Elsa Nownes**, University of Tennessee; **Larry Nucci**, University of Illinois at Chicago; **D. Kimbrough Oller**, University of Maine; **Willis Overton**, Temple University; **Martin Packer**, Duesquesne University; **Josef Perner**, University of Salzburg; **Robert Plomin**, Institute of Psychiatry, London; **Paul Quinn**, University of Pittsburgh; **Jane Rankin**, Drake University; **Mary Jo Ratterman**, Franklin & Marshall College; **J. Steven Reznick**, Yale University; **Mary Rothbart**, University of Oregon; **Carolyn Rovee-Collier**, Rutgers University; **Stephanie Rowley**, University of North Carolina at Chapel Hill; **Diane Ruble**, New York University; **Cristina Saccuman**, University of California, San Diego; **Ian St James-Roberts**, Thomas Coram Research Unit; **Robert Serpell**, University of Maryland, Baltimore County; **Ellen Seiter**, University of California, San Diego; **Daniel Smothergill**, Syracuse University; **Romy V. Spitz**, Rutgers University; **Charles M. Super**, University of Connecticut; **Laura Thompson**, New Mexico State University; **Terri Thorkildsen**, University of Illinois, Chicago; **Marion Underwood**, University of Texas at Dallas; **S. Stavros Valenti**, Hofstra University; **Douglas Wahlsten**, University of Alberta; **Marsha Walton**, Rhodes College; **Sandra Waxman**, Northwestern University; **Gordon Wells**, University of Toronto; **Mara Welsh**, University of California, Berkeley; **Patricia Zukow-Goldring**, University of California, Los Angeles.

We are also grateful to Stacey Alexander, Jessica Bayne, Megan Burns, Margaret Comaskey, Peter Deane, Craig Donini, Yuna Lee, Barbara Anne Seixas, and Catherine Woods of Worth Publishers.



Michael Cole  
Paula Free



# Brief Contents

PREFACE xiv

CHAPTER 1: The Study of Human Development 1

## PART I: IN THE BEGINNING

CHAPTER 2: The Human Heritage: Genes and Environment 49

CHAPTER 3: Prenatal Development and Birth 79

## PART II: INFANCY

CHAPTER 4: Early Infancy: Initial Capacities and the Process of Change 127

CHAPTER 5: The Achievements of the First Year 179

CHAPTER 6: The End of Infancy 217

CHAPTER 7: Early Experience and Later Life 257

## PART III: EARLY CHILDHOOD

CHAPTER 8: Language Acquisition 293

CHAPTER 9: Early Childhood Thought: Islands of Competence 335

CHAPTER 10: Social Development in Early Childhood 373

CHAPTER 11: The Contexts of Early Childhood Development 421

## PART IV: MIDDLE CHILDHOOD

CHAPTER 12: Cognitive and Biological Attainments of Middle Childhood 467

CHAPTER 13: Schooling and Development in Middle Childhood 503

CHAPTER 14: Social Development in Middle Childhood 553

## PART V: ADOLESCENCE

CHAPTER 15: Biological and Social Foundations of Adolescence 603

CHAPTER 16: The Psychological Achievements of Adolescence 643

EPILOGUE 693

APPENDIX: GUIDE TO DISCUSSIONS OF SPECIFIC ASPECTS OF DEVELOPMENT A-1

GLOSSARY G-1

REFERENCES R-1

ILLUSTRATION CREDITS IC-1

NAME INDEX NI-1

SUBJECT INDEX SI-1

# Contents

## **PREFACE** xiv

## **CHAPTER 1 THE STUDY OF HUMAN DEVELOPMENT** 1

### **EARLY BEGINNINGS** 2

The Rise of a New Discipline 3

### **MODERN DEVELOPMENTAL PSYCHOLOGY** 5

### **THE CENTRAL QUESTIONS OF DEVELOPMENTAL PSYCHOLOGY** 7

Questions about Continuity 7

*Are the Principles of Human Development Distinctive?* 8

*Is Individual Development Continuous?* 9

*Are There “Critical” or “Sensitive” Periods of Development?* 11

Questions about the Sources of Development 13

Questions about Individual Differences 14

### **THE DISCIPLINE OF DEVELOPMENTAL PSYCHOLOGY** 15

Criteria of Scientific Description 15

Methods of Data Collection 17

*Self-Reports* 17

*Naturalistic Observations* 17

*Experimental Methods* 21

*Clinical Interview Methods* 24

Research Designs 27

*Longitudinal Designs* 27

*Cross-Sectional Designs* 29

*Microgenetic Methods* 30

Research Designs and Data-Collection Techniques in Perspective 30

The Role of Theory 31

*The Biological-Maturation Framework* 33

*The Environmental-Learning Framework* 34

*The Constructivist Framework* 35

*The Cultural-Context Framework* 36

### **THIS BOOK AND THE FIELD OF DEVELOPMENTAL PSYCHOLOGY** 37

### **SUMMARY** 41

**BOX 1.1** Philosophical Forefathers of Developmental Psychology 12

**BOX 1.2** Correlation and Causation 22

**BOX 1.3** Ethical Standards for Research with Children 25

## **PART I: IN THE BEGINNING**

## **CHAPTER 2 THE HUMAN HERITAGE: GENES AND ENVIRONMENT** 49

### **SEXUAL REPRODUCTION AND GENETIC TRANSMISSION** 51

Mitosis: A Process of Cell Replication 52

Meiosis: A Source of Variability 52

Sexual Determinism: A Case of Variability 54

### **GENOTYPE AND PHENOTYPE** 56

The Laws of Genetic Inheritance 56

*Sex-Linked Genetic Effects* 57

Genes, the Organism, and the Environment 58

*Studying Gene–Environment Interactions* 58

*Range of Reaction* 59

*Canalization* 60

*The Study of Genetic Influences on Human Behavior* 61

*Estimating Genetic Influence through Kinship Studies* 61

### **MUTATIONS AND GENETIC ABNORMALITIES** 66

Sickle-Cell Anemia: An Example of Gene–Environment Interaction 68

Down Syndrome: A Chromosomal Error 68

Sex-Linked Chromosomal Abnormalities 69

Phenylketonuria: A Treatable Genetic Disease 70

### **BIOLOGY AND CULTURE** 71

Acquired Characteristics 71

Coevolution 72

### **SUMMARY** 74

**BOX 2.1** Twinning 55

**BOX 2.2** The Concept of Heritability and Myths about Genetic Influence 62

**BOX 2.3** Siblings: So Much in Common but So Diverse 65

**BOX 2.4** Genetic Counseling 72

## **CHAPTER 3 PRENATAL DEVELOPMENT AND BIRTH** 79

### **THE PERIODS OF PRENATAL DEVELOPMENT** 81

The Germinal Period 81

<i>The First Cells of Life</i>	82
<i>The Emergence of New Forms</i>	82
<i>Implantation</i>	84
The Embryonic Period	84
<i>Sources of Nutrition and Protection</i>	84
<i>The Growth of the Embryo</i>	84
<i>The Emergence of Embryonic Movement</i>	85
The Fetal Period	86
<i>Fetal Activity</i>	87
<i>Functions of Fetal Activity</i>	89
<b>THE DEVELOPING ORGANISM IN THE PRENATAL ENVIRONMENT</b>	<b>90</b>
The Fetus's Sensory Capacities	90
<i>Sensing Motion</i>	90
<i>Vision</i>	91
<i>Sound</i>	91
Fetal Learning	91
Maternal Conditions and Prenatal Development	92
<i>The Effects of Maternal Attitudes and Psychological Stress</i>	92
<i>Nutritional Influences on Prenatal Development</i>	93
<i>Extreme Malnutrition</i>	93
<i>Undernourishment and Associated Factors</i>	94
Teratogens: Environmental Sources of Birth Defects	95
<i>Drugs</i>	96
<i>Infections and Other Conditions</i>	99
<i>Principles of Teratogenic Effects</i>	102
<b>PRENATAL DEVELOPMENT RECONSIDERED</b>	<b>104</b>
<b>BIRTH: THE FIRST BIO-SOCIAL-BEHAVIORAL SHIFT</b>	<b>105</b>
The Stages of Labor	106
Cultural Variations in Childbirth	107
Childbirth in the United States	107
<i>Childbirth Pain and Its Medication</i>	108
<i>Medical Interventions during Childbirth</i>	109
<b>THE NEWBORN'S CONDITION</b>	<b>109</b>
Assessing the Baby's Viability	110
<i>Physical Condition</i>	110
<i>Behavioral Condition</i>	111
Problems and Complications	112
<i>Prematurity</i>	112
<i>Low Birth Weight</i>	113
<i>Developmental Consequences</i>	114
<b>BEGINNING THE PARENT-CHILD RELATIONSHIP</b>	<b>115</b>
The Baby's Appearance	115
Social Expectations	117
<b>SUMMARY</b>	<b>118</b>
<b>Box 3.1</b> The Development of Sexual Differentiation	87
<b>Box 3.2</b> The Baby's Experience of Birth	110
<b>Box 3.3</b> The Bonding Myth	116
<b>Box 3.4</b> The Parents' Response to the Baby's Arrival	118

## PART II: INFANCY

### CHAPTER 4 EARLY INFANCY: INITIAL CAPACITIES AND THE PROCESS OF CHANGE 127

#### DEVELOPMENT OF THE BRAIN 128

Neurons and Networks of Neurons 129

The Central Nervous System and the Brain 130

#### EARLIEST CAPACITIES 132

Sensory Processes 133

*Hearing* 133

*Vision* 135

*Taste and Smell* 137

*Touch, Temperature, and Position* 138

Response Processes 139

*Reflexes* 139

*Emotions* 141

*Temperament* 144

#### BECOMING COORDINATED WITH THE SOCIAL WORLD 147

Sleeping 147

Feeding 149

Crying 151

#### MECHANISMS OF DEVELOPMENTAL CHANGE 153

From Sucking to Nursing 153

The Biological-Maturation Perspective 154

*Reflexes and the Brain* 154

The Environmental-Learning Perspective 155

*Classical Conditioning* 156

*Operant Conditioning* 158

The Constructivist Perspective: Piaget 159

*Piaget's Theory of Developmental Change* 160

*The Sensorimotor Period and Its Substages* 162

*Piaget's Theory and the Social Environment* 164

The Cultural-Context Perspective 166

#### INTEGRATING THE SEPARATE THREADS OF DEVELOPMENT 169

#### THE FIRST POSTNATAL BIO-SOCIAL-BEHAVIORAL SHIFT 169

The Emergence of Social Smiling 169

Biological Contributions to Social Smiling 171

The Social Smile and Social Feedback 171

#### SUMMING UP THE FIRST 2½ MONTHS 172

#### SUMMARY 174

**Box 4.1** Sleeping Arrangements 150

**Box 4.2** Comforting the Fussy Baby 152

**Box 4.3** Experience and Development of the Brain 156

**Box 4.4** Imitation in the Newborn? 160

### CHAPTER 5 THE ACHIEVEMENTS OF THE FIRST YEAR 179

#### BIOLOGICAL CHANGES 181

Size and Shape 181

Muscle and Bone	183	Problem Solving	227
<i>Sex Differences in Rate of Growth</i>	183	Play	228
The Brain	183	Imitation	229
<b>PERCEPTUAL-MOTOR DEVELOPMENT</b>	<b>184</b>	The Growth of the Ability to Categorize	231
Reaching and Grasping	184	The Ability to Perceive Pictures as Representations	232
Locomotion	185	The Changing Relations between Words, Thoughts, and Actions	233
<b>COGNITIVE CHANGES</b>	<b>187</b>	<b>THE DEVELOPMENT OF CHILD-CAREGIVER RELATIONS</b>	<b>234</b>
Piaget's Constructivist Explanation	187	Explanations of Attachment	235
<i>Sensorimotor Development</i>	187	<i>Sigmund Freud's Drive-Reduction Explanation</i>	235
<i>Object Permanence: The Growth of Representation</i>	191	<i>Erik Erikson's Psychosocial Explanation</i>	235
Are Infants Precocious? Challenges to Piaget's Theory	193	<i>John Bowlby's Ethological Explanation</i>	236
<i>Reasoning about Nonvisible Objects</i>	194	<i>Evidence from Animal Experiments</i>	237
<i>Infant Arithmetic</i>	196	Patterns of Attachment	239
<i>Early Understanding of Causality</i>	196	<i>The Causes of Variations in Patterns of Attachment</i>	243
Assessing the Evidence for Infant Precocity	197	<i>The Developmental Course of Attachment</i>	246
Categorizing: Knowledge about Kinds of Things	198	<b>A NEW SENSE OF SELF</b>	<b>247</b>
The Growth of Memory	203	Self-Recognition	248
Recall and Wariness: Evidence for a Developmental Discontinuity?	204	The Self as Actor	249
<i>Changes in Memory and Classification</i>	204	A Sense of Standards	249
<i>Memory, Categorization, and the Onset of Wariness</i>	205	The Emergence of Secondary Emotions	250
<b>A NEW RELATIONSHIP WITH THE SOCIAL WORLD</b>	<b>206</b>	<b>THE END OF INFANCY</b>	<b>251</b>
The Role of Uncertainty in Wariness	206	<b>SUMMARY</b>	<b>252</b>
A New Form of Emotional Relationship	208	<b>Box 6.1</b> Attachment to Fathers and Others	242
The Changing Nature of Communication	209	<b>CHAPTER 7 EARLY EXPERIENCE AND LATER LIFE</b>	<b>257</b>
<i>Social Referencing</i>	209	<b>OPTIMAL CONDITIONS FOR INFANT DEVELOPMENT</b>	<b>259</b>
<i>The Beginnings of Language Comprehension and Speech</i>	209	<b>EFFECTS OF PARENT-CHILD SEPARATION</b>	<b>262</b>
<b>A NEW BIO-SOCIAL-BEHAVIORAL SHIFT</b>	<b>211</b>	Temporary Separation from Parents	262
<b>SUMMARY</b>	<b>212</b>	Extended Separation from Parents	263
<b>Box 5.1</b> The Role of Practice in Motor Development	188	<i>Children of the Crèche</i>	263
<b>Box 5.2</b> Cross-Modal Perception	195	<i>Children Reared in Well-Staffed Orphanages</i>	267
<b>Box 5.3</b> Action and Understanding	199	Isolated Children	269
<b>CHAPTER 6 THE END OF INFANCY</b>	<b>217</b>	<b>VULNERABILITY AND RESILIENCE</b>	<b>270</b>
<b>BIOLOGICAL MATURATION</b>	<b>219</b>	Characteristics of the Family	271
<b>PERCEPTUAL-MOTOR COORDINATION</b>	<b>220</b>	Characteristics of the Community	273
Locomotion	220	Characteristics of the Child	273
Manual Dexterity	222	<i>The Impact of Later Circumstances</i>	275
Control of Elimination	223	<b>RECOVERY FROM DEPRIVATION</b>	<b>277</b>
<b>A NEW MODE OF THOUGHT</b>	<b>224</b>	Harlow's Monkeys Revisited	277
Completing the Sensorimotor Substages	224	Recovery from the Effects of Isolation	279
<i>Substage 5: Tertiary Circular Reactions (12-18 Months)</i>	224	Implications for Human Recovery	280
<i>Substage 6: Representation (18-24 Months)</i>	225	<b>THE PRIMACY OF INFANCY RECONSIDERED</b>	<b>281</b>
Mastery of Object Permanence	226	Attachment	282
		Cognitive Development	284
		Coming to Terms with Limited Predictability	285
		<b>SUMMARY</b>	<b>285</b>