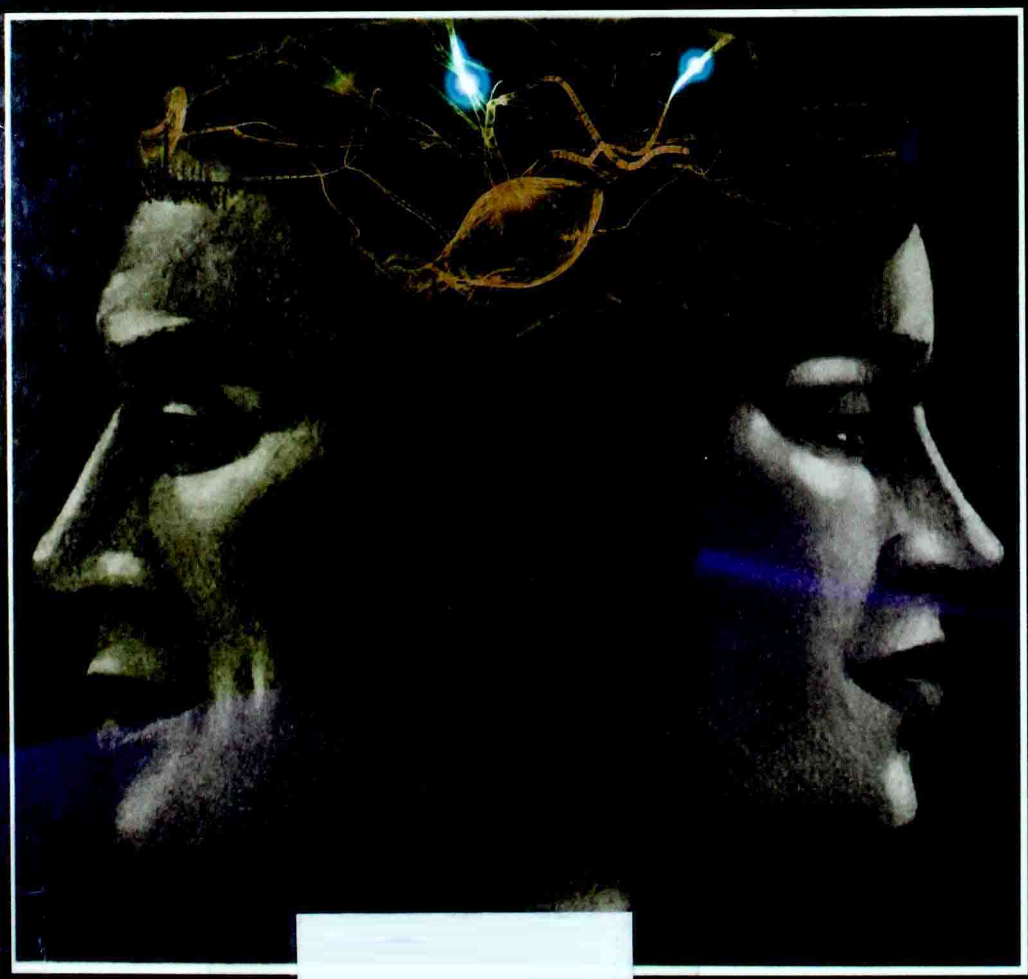
Sex Differences in Cognitive Abilities

DIANE F. HALPERN



Fourth Edition

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Diane F. Halpern
Claremont McKenna College

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Sex Differences in Cognitive Abilities

Fourth Edition

This book is dedicated to the wonderful children in my life: Amanda Halpern, Jason Halpern, and Belle Halpern-Duncan

Preface to the Fourth Edition

It is hard to believe, but it has been over 10 years since the publication of the third edition of *Sex Differences in Cognitive Abilities* and 25 years since the first edition. I had no idea when I started studying this controversial topic that it would consume so much of my academic life. Much has changed over the intervening two and a half decades, with the pace of change accelerating since the last edition.

The biological revolution has changed our understanding of the mind and behavior in general, but particularly in the way we think about cognitive sex differences. Modern neuroscience has permeated every area of psychology and the other sciences and social sciences, but even with its rapid developments it is clearly in its own infancy. Perhaps one of the greatest contributions from the biological revolution is that we can now see changes in the brain that result from experience. In a strange twist, modern biological techniques have advanced our understanding of the importance of environmental variables.

One of the most distressing outcomes of modern neuroscience is the way findings are being misused to advance political agendas. Fine (2010) has coined the term "neurosexism" for the misuse of neuroscience to justify sex role stereotypes. In a clever play on words, she calls the irresponsible use of findings from the brain sciences "brain scams." Supporters of the idea that men and women are essentially different—not just in their respective roles in reproduction but in how they learn and think—cite differences in the female and male brain to support their conclusions (e.g., Baron-Cohen, 2004; Brizendine, 2006; Sax, 2005). What they do not understand is the very long leap from neurons to actual behavior and the way experiences alter the brain.

Another major change since the last edition of *Sex Differences in Cognitive Abilities* was published is the many exaggerated and unreplicated claims regarding cognitive sex differences. They crop up in many places. Perhaps the most distressing development is the misuse of what we know about cognitive sex differences to claim that boys and girls are so different they need different types of education. A group of researchers has formed the American Council for Co-Educational Schooling in response to claims that we need to segregate girls and boys in schools. Interested readers are referred to their website,

www.coedschools.org, for answers to frequently asked questions, research, and other data-based information.

There have been many changes in our understanding of cognitive sex differences since the last edition. I am excited about sharing my understanding of this complex and controversial topic with a new generation of readers. Here are just a few that are explained in more detail in the text: differences among average females and males tend to be much smaller than differences found among females and males with low and high abilities; people's beliefs about group stereotypes affect their performance on high stakes examinations, but with minimal interventions belief-related influences can be reduced or eliminated; cross-cultural research has shown that some sex differences are largest in those countries that are the most gender-equal, using many different measures of gender equality; education and training can reduce or eliminate some cognitive sex differences; many of the cognitive differences are directly related to average differences in the interests of males and females; hormones affect cognitive abilities, but their effects are complex and not fully understood; and sex role stereotyping increases when teachers and others make children's sex salient (e.g., boys line up here, this bulletin board is for girls' work).

My goals in writing this book were for readers to come away with an understanding of where sex differences are found and where they are not found; a recognition of the critical importance of good research as well as some idea of what constitutes good research; an amiable skepticism, which means an open-minded questioning about the nature and strength of evidence behind any claim of sex difference; an appreciation of the complexity of the questions about cognitive sex differences; and the ability to see multiple sides of an issue, while also realizing that some claims are well reasoned and supported by data and others are politicized pseudoscience.

In several places in this book, I bring up the idea that people are naturally biased to prefer information that supports their particular world views. Of course, I recognize that I am not immune to personal biases. After the publication of past editions, I received emails claiming that I was biased in favor of biological and in favor of environmental explanations, which I took to mean that I did a good job of upsetting people at both ends of the political spectrum. I have tried to be as fair in presenting all of the relevant data as I can be. I stayed close to the data, describing relevant studies and explaining the findings. But in order for this book to be meaningful, I also presented my interpretation of the research. If you only read selected portions of this book, you will find support for almost any viewpoint, but if you read it all, you will see that there are strong data for many different views and that the totality of the data is what is needed to see the larger picture.

I sincerely thank the many wonderful reviewers for the fourth edition. The list of reviewers is a virtual who's who in the topic areas covered. Reviewers contributed their expertise, which greatly improved this book. I am grateful for the careful reviews by these outstanding psychologists:

Heather Butler, Claremont Graduate University
Beth Casey, Boston College
Jacquelyn Cranney, University of New South Wales, Australia
Alice Eagly, Northwestern University
Sue Frantz, Highland Community College
Richard Haier, University of California, Irvine
Agneta Herlitz, Karolinska Institutet
Mary Hegarty, University of California, Santa Barbara
Lynn Liben, Pennsylvania State University
Carol Lynn Martin, Arizona State University
David I. Miller, University of California, Berkeley
Melanie Page, Oklahoma State University
Patricia Puccio, College of DuPage
Emily Savage-McGlynn, University of Cambridge
Daniel Voyer, University of New Brunswick

Several anonymous reviewers and the students in Psychology 131, Sex Differences in Cognitive Abilities, fall semester 2010 provided helpful comments.

Reviewers for earlier editions are listed in the earlier prefaces. I carefully considered a wide range of reviews, and although I wish that I could blame any errors you may find on the reviewers, I will have to take responsibility for the contents of this book. Research is advancing at a very fast pace. I can only guess at the changes that I will make in the next edition.

I hope you will enjoy reading this book—that it will make you think in new ways about the complexities in cognitive sex differences and that it will inspire the next generation of researchers and inform parents, teachers, and policy makers about the ways in which males and females are different and similar.

With sincere best wishes,

Preface to the Third Edition

What is the meaning of differences and why are we so afraid of them? These deceptively simple questions are at the heart of this book. Of course, females and males differ in some ways and are similar in others, but where are the differences and the similarities, and how can we make sense out of them? Perhaps there are even more fundamental questions that need to be asked first: Why is it important to know about differences? Are answers even possible given the many ways that belief systems bias the conclusions that we make and the decisions about what we want to know? All of these questions have a long and turbulent history entangled with beliefs about the appropriate roles of men and women and the political and economic ramifications of the way we answer them. The questions and answers are philosophical, empirical, political, historical, and interesting to large numbers of people both inside academia and in the real world that exists beyond the ivy curtain. Those opposed to research on sex differences fear that it will legitimize false stereotypes, obscure similarities, and provide fuel for those determined to convince the world of the inferiority of females or be used in ways that discriminate against males. As I write this preface, the new, repressive government in Afghanistan has forbidden all girls and women from attending school or working outside the home. I hope that this stunning act of discrimination will be history by the time you are reading this book. But, it does underscore an important reality, the potential for the misuse of information on cognitive sex differences is cause for concern; no wonder so many people are afraid of any research that examines group differences.

In writing about such a sensitive and politically explosive topic, I have tried to present the most recent findings along with some age-old questions about "maleness" and "femaleness" in as fair and unbiased way as possible. I wanted to go beyond the pop culture version of sex differences that is presented on talk shows and in the usual array of books found in many book stores to provide a reasoned and empirical view of one of psychology's most fundamental topics. Of course, by definition, none of us can see our own blind spots, so I am certain that many readers will see biases, especially if the information provided or the way it is presented does not agree with their own favored point of view. Following the publication of previous editions of this book, I received mail

from many readers—some praising my fair-mindedness and the clear way in which I presented information (funny, but I remember these the best), but others taking exception to the way a particular area of research or theory was interpreted. I was pleased to find that the criticisms came from all ends of the political spectra, which I interpreted to mean that I had done a fairly good job of angering all sorts of people. In other words, I had succeeded at interpreting the huge and diverse literature. I hope that this edition comes even closer to achieving that goal.

The years since the publication of the second edition of *Sex Differences in Cognitive Abilities* have seen an explosion of new theories and research into the many questions about sex differences in cognition. New techniques for peering into the human brain have changed the nature of the research questions that we can ask and the kinds of answers we can expect. There have been surprising new findings about the influence of sex hormones throughout the life span for both women and men. Readers are warned that the burgeoning area of cognitive neuroscience is still in its own perinatal period, which means that inferences about the brain bases of cognition are extremely fragile and likely to change as the field develops. There has also been a rapid increase in the number of studies that examine unconscious and automatic processes that influence how people think when they become aware of category variables like one's sex, race, or age. The most important advance since the publication of the second edition of this book is the renewed emphasis on the continuity of environmental and biological variables, a perspective that blurs the distinction between these two types of influences. The psychobiosocial model that I advocate discards the nature–nurture dichotomy and replaces it with a continuous feedback loop in which nature and nurture are inseparable. I hope that this reconceptualization of the variables that influence who we are and how we develop will move us away from the nature–nurture tug-of-war to a more holistic and reciprocal view of human cognitive development.

ACKNOWLEDGMENTS

My sincere thanks goes to those unsung heroes who have read and commented on some or all portions of this book as it progressed through numerous drafts. I am enormously grateful for the insights of Dr. Marcia Collear at Middlebury College, Dr. Ann Gallagher at the Educational Testing Service, and Dr. George Spillach at Washington College. I also thank numerous students who have helped with this edition, especially (soon-to-be-Ph.D.) Mary LaMay at Loma Linda University. Each of these wonderful scholars gave generously of their time and expertise and each of these special people provided encouraging feedback and helpful ideas throughout the writing process.

The contributions of many students who have influenced my thinking and writing are gratefully acknowledged, both those who have asked the "really

tough questions" in my own classes and those who used earlier editions of this book in classes taught by other instructors. I am grateful to all of you who have written and e-mailed from many different places in North America and from numerous countries around the world. Your thoughtful comments, kind words, and unique international perspectives are sincerely appreciated.

Preface to the Second Edition

It seems that everyone has strong opinions about the ways in which females and males do and don't differ. Television talk show hosts and guests regularly "debate" (read, that try to out-shout each other), research findings dot the front pages of newspapers, and the rest of us talk, listen, and argue about the many questions about sex differences and similarities.

Yet, despite all the heated rhetoric, few people outside of academia are aware of the way in which psychologists, biologists, sociologists, and researchers from almost every other discipline have studied the questions about sex differences and similarities and the kinds of answers they have provided. In this book, I synthesize and summarize the enormous research literature that pertains to the ways males and females differ in their cognitive abilities. The intended audience for this book is anyone who wants to read a thoughtful analysis of the complex issues involved in asking and answering multifarious questions. A basic-level background in psychology, biology, and research methods will help readers with some of the more technical points, but readers without such a background can follow the main points. Upper division undergraduates and beginning graduate students should benefit the most from reading this book as they have already addressed some of the issues in their other courses.

I hope that every reader will take away something of value from this book—a new idea, a different way of conceptualizing the issues, a more open mind, an appreciation for the immense complexity of the issues involved, a more thoughtful approach to complicated problems, a framework for interpreting the quality of evidence, an understanding of the way societal values influence the way questions are posed and the type of answers we get, and the knowledge that there is a reciprocal relationship among psychological, biological, and societal influences that makes simple answers to complicated questions simply wrong. This is a long list of desired outcomes, but if most readers gain in at least one of these areas, then, I have successfully accomplished the goals that I set for myself when I began writing.

ACKNOWLEDGMENTS

This is my favorite part, the opportunity to thank the many wonderful colleagues who helped me with this book. I am grateful to Dr. Claire Etaugh at Bradley University and Dr. Nora Newcombe at Temple University for reading an earlier draft of the entire book. Their insightful comments have greatly improved the text. Dr. Neil Campbell from the University of California, Riverside, Dr. Michelle Paludi from Hunter College, Dr. Anne Petersen from Pennsylvania State University, and Dr. JoAnna Worthley from California State University, San Bernardino, all read chapters and generously shared their expertise with me. Of course, I would like to be able to attribute any errors that exist in the text to them, but, unfortunately, I will have to assume this responsibility.

Many colleagues have written to me to share their research and to comment on the myriad of issues. I thank them and the many other researchers whose work I have cited. I also thank my wonderful family, my husband Sheldon and my children Joan and Evan, for "being there" and for acting as sounding boards as I read my way through a mountain of literature and asked them to consider the many questions pertaining to sex differences in cognitive abilities.

Preface to the First Edition

It seemed like a simple task when I started writing this book. All I had to do was provide a comprehensive synthesis of the theories and research concerning the causes, correlates, and consequences of cognitive sex differences and make some meaningful conclusions that were supported in the literature. My interest in the area grew naturally out of several years of teaching both cognitive psychology and psychology of women to college classes. The idea that women and men might actually think differently, that is have different preferred modes of thinking or different thinking abilities, came up in both classes. At the time, it seemed clear to me that any between-sex differences in thinking abilities were due to socialization practices, artifacts and mistakes in the research, and bias and prejudice. After reviewing a pile of journal articles that stood several feet high and numerous books and book chapters that dwarfed the stack of journal articles, I changed my mind. The task I had undertaken certainly wasn't simple and the conclusions that I had expected to make had to be revised.

The literature on sex differences in cognitive abilities is filled with inconsistent findings, contradictory theories, and emotional claims that are unsupported by the research. Yet, despite all of the noise in the data, clear and consistent messages could be heard. There are real, and in some cases sizable, sex differences with respect to some cognitive abilities. Socialization practices are undoubtedly important, but there is also good evidence that biological sex differences play a role in establishing and maintaining cognitive sex differences, a conclusion that I wasn't prepared to make when I began reviewing the relevant literature.

The conclusions that I reached about cognitive sex differences are at odds with those of other authors (e.g., Caplan, MacPherson, & Tobin, 1985; Fairweather, 1976). There are probably several reasons why the conclusions in this review are different from the earlier ones. I believe that the data collected within the last few years provide a convincing case for the importance of biological variables, and that earlier reviews were, of course, unable to consider these findings, Other reviewers were sometimes quick to dismiss inconsistent theories and experimental results as symptomatic of a chaotic field of investigation. If they had reviewed the inconsistencies, they would have found that

many of them are resolvable and that some of the theories and research could be eliminated because they had become outdated or had not received experimental support, thereby reducing the dissonance in the literature. Although there is still much that we don't know in this area, plausible conclusions based on the information that is currently available can be made.

This book was written with a broad audience in mind—bright undergraduates and graduates and their professors and general readers who are intrigued with the questions and answers about cognitive sex differences. It could serve as a supplemental book in many courses in psychology and other fields. The other issues raised in this book are appropriately addressed in introductory psychology, sociology, education, philosophy, human development, and biology courses. It is also appropriate for advanced courses in sex roles, sex differences, human genetics, child and adult development, education theory and research, social psychology, and physiological psychology because of the broad perspective needed in understanding cognitive sex differences.

The topics addressed vary in their complexity, with brain–behavior relationships more difficult to explain than psychosocial influences on the development of cognition. My goal was to make even the advanced topics in biology and statistics comprehensive without oversimplifying multifaceted relationships or losing sight of the fact that the problems are complex. The topics addressed in this book go far beyond the usual "pop" coverage found in the popular press. I hope that despite my efforts to emphasize serious research and conceptual issues I have been able to convey to readers some of my fascination with one of the most controversial and politically charged topics in modern psychology, the psychology of cognitive sex differences.

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