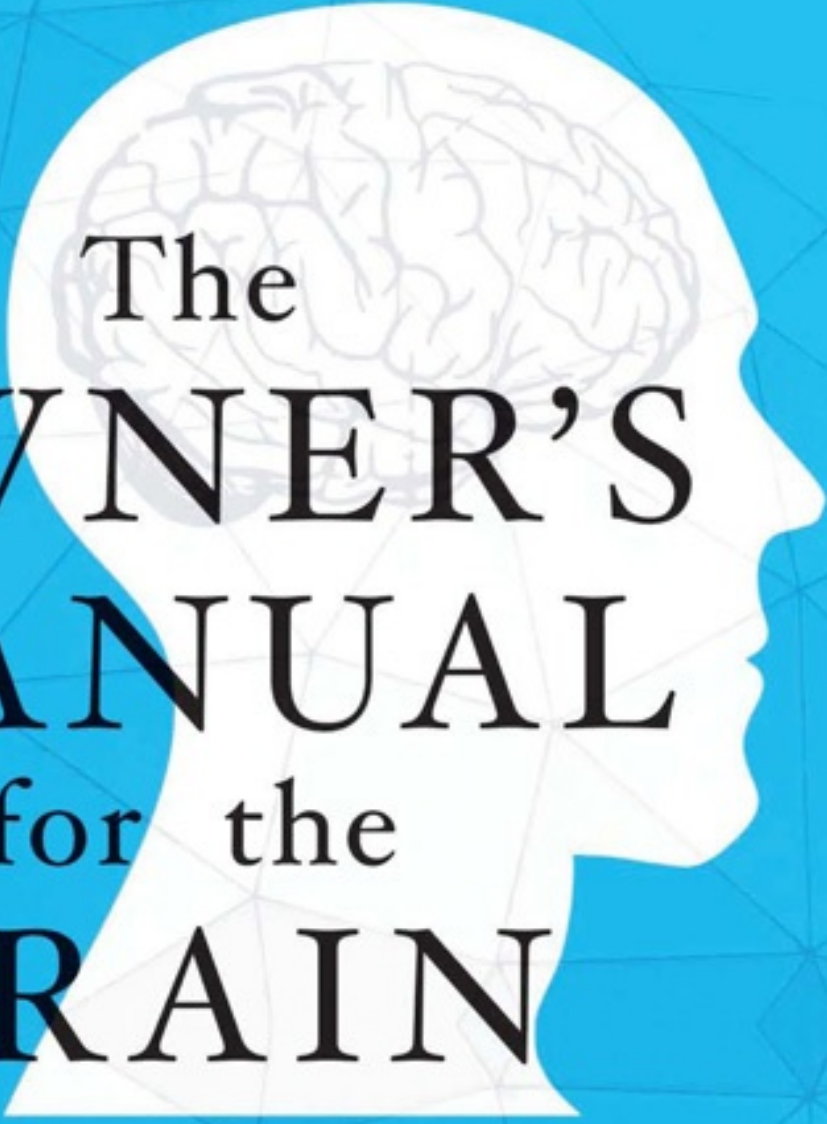


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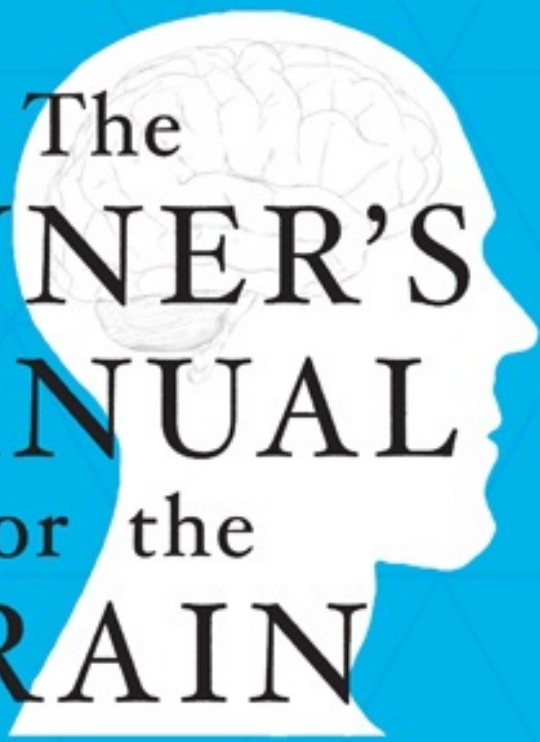


The
**OWNER'S
MANUAL**
for the
BRAIN

THE ULTIMATE GUIDE TO PEAK
MENTAL PERFORMANCE AT ALL AGES

- Achieve Happiness
- Improve Sleep
- Maximize Creativity
- Understand Emotions
- Sharpen Intelligence
- Increase Willpower
- Manage Stress
- Enhance Memory
- Master New Habits
- Reverse Aging

Pierce J. Howard, Ph.D.



The
**OWNER'S
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FOURTH
EDITION

Pierce J. Howard, Ph.D.



WILLIAM MORROW

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The Author

Praise for *The Owner's Manual for the Brain*

Credits

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About the Publisher

Quick Content Guide

Although everyone will find each chapter in this book relevant to his or her life in some way, those who fill special roles may find certain chapters of particular interest. Parts Two and Three deal with subjects like sleep, music, and sex, which affect everybody every day; therefore, we suggest that all readers, regardless of their roles, would benefit from the materials in these chapters.

Below are listed several role categories and the additional chapters that may be of special interest to people in these roles.

Doctors, lawyers, and others in professional practice	10, 20, 22, 24–25, 28, 33–34
Human resource professionals	All
Managers	9–10, 24–34
Mental health professionals	All
Negotiators	9, 24–26, 30–31
Parents	All
Religious professionals	7, 9, 20, 25–35
Research-and-development professionals	10, 24–26, 33–34
Salespeople	10, 27, 30, 33–34
Students	5, 20–23, 29–35
Teachers, trainers, and coaches	5, 20–23, 29–35

“There are two ways of spreading light: to be the candle or the mirror that reflects it.”

—Edith Wharton

Preface

Why this book?

Tomes about the mind and brain pepper the shelves of airport kiosks and bookstores from Phoenix to Philly. The available books about the brain can be divided into two categories: research reports and practical applications. Neurobiology texts belong in the first category, and how-to books (*How to Increase Your Memory*, *How to Be More Creative*) belong in the second.

This book serves to create an explicit overlap between these two categories. Research books generally decline to identify the everyday applicability of their findings—indeed, that is not their purpose. Practical books usually avoid the explicit connection between a piece of advice and its basis in research. This book is meant to yoke the two together as a team by saying, “Here’s what we know about memory storage in the brain, and here’s how that knowledge can help us improve our recall of information.” When I presented at Eric Jensen’s brain conference in San Diego, he had listed speakers in three categories: researchers, practitioners, and interpreters. The last is what I am—an interpreter, one who follows the research and interprets as needed to the practitioners.

Why me? I’m not an academic who must publish or perish, and I’m not a natural writer possessed with an irresistible urge to put pen to paper (or, more aptly, fingertips to keyboard). So why did I write this book? A story will explain.

All my life I had viewed myself as something of a dilettante, with a wide variety of interests. That changed in the spring of 1988, when I read *The Universe Within*, by Morton Hunt. Hunt, a science popularizer, introduced the English-reading world to cognitive science, the interdisciplinary approach to understanding the workings of the mind-brain. Each chapter of his book summarized research in an area that had been of interest to me: problem solving, creativity, learning theory, and so on. Voilà! I was no longer a dilettante, but a cognitive scientist. I began to read everything I could find dealing with this new field (which is described in chapter 1), and I found that the extensive scientific literature on brain research provided me with a basis for my applied interests.

In December 1988, I began serving a term on the program committee of the local chapter of the American Society for Training and Development (ASTD). The committee asked for program

suggestions for monthly meetings in 1989, so I suggested that we bring in a speaker on the subject of cognitive science. After hearing my justification, they agreed that the chapter would benefit from such a program and asked me to find a speaker. I was able to find speakers who were expensive and practical in their approach or speakers who were inexpensive and theoretical in their approach, but I had to report that I was unable to find anyone we could afford who was willing to present an application-oriented program to our group. I argued, and they agreed, that the more theoretical speakers would be hooted out of the hall. As a result, they asked, “Pierce, why don’t you do a program?” I agreed.

“It is like the man who claimed to be selling Abraham Lincoln’s ax—he explained that over the years the head had to be replaced twice and the handle three times.”

—Stephen Pinker,
The Language Instinct

I presented the program—entitled “Brain Update”—in August 1989. After an encouraging reception, I presented the program in two other cities and then at the regional meeting in Gatlinburg, Tennessee, in the fall of 1990. After each of the four presentations, people came up to me and asked, “What have you written? Your content is fascinating, but we’d like something written to consider in more depth.” Responding to this encouragement as evidence of a genuine need, my wife and partner, Jane, and I decided that I should cut back on my consulting duties and write a book. That was in August 1991. I started writing and reading to fill in the gaps, closing in on fulfilling my commitment to provide you with written documentation of what I enjoyed talking about from the front of the classroom. The result was the first edition of *The Owner’s Manual for the Brain*, published in 1994; five years later came the second edition; seven years later, the third. With this fourth edition, as with earlier ones, I have found that some, but not all, of the previous editions have been replaced. Much has been added. Like Abe Lincoln’s ax, the form remains the same.

How is this book unique? First, it stands with one foot in the research camp and the other in practice. Second, it reflects my 40-plus years of experience as a management consultant. (I cannot apologize for the fact that this book reflects the part of the world with which I am familiar.) Third, I have included only brain research findings that have widespread practical applications. Findings that are interesting but not generally useful have not been included. Fourth, for the most part, the structure is aimed at those using the research, not the researchers themselves.

The basic structure of the book employs what I like to refer to as the “So what?” format. The typical response to reported research findings is “So what?” For example, research shows that the level of the hormone melatonin is directly related to the quality of our sleep. You may say, “So what?” Well, this book is designed with that question in mind. Every piece of research reported is followed by one or more specific suggestions for its application. Here is an example of what you will find.

TOPIC 16.5

Sleep and Exercise

Exercising tends to elicit cortical alertness, which is not what you want

when going to sleep. Exercise relaxes you after experiencing stress, but good aerobic exercise generally puts your nervous system in a state of moderate arousal. In this condition, you are ideally suited for mental tasks. In order to sleep soon after a workout, you would need to consume carbohydrates and dairy products.

Applications

- 1 Exercise no later than several hours before bedtime.
- 2 If you must exercise just before retiring for the evening (I know a television sports announcer who exercises after a night game because he's so keyed up), try reading a relatively unemotional book in bed rather than an exciting one (for example, Plato rather than Dan Brown) to help you get to sleep.

The book is organized around these topics (except for chapters 1, 2, and 36). The numerical identifier refers to the chapter number and the sequence within that chapter. Although most of the application ideas are mine, several of my readers have suggested additional ideas. I have indicated their authorship following the suggestion. I look forward to including suggestions from other readers in subsequent editions of this book.

In its most general sense, this book is for people who want to use their heads. More specifically, it is for lifelong learners, professionals who value keeping up with or ahead of the game, people developers, human resource professionals, leaders, consultants (internal and external), supervisors of teachers, training managers, educators of teachers, adult education professionals, train-the-trainer professionals, curriculum writers, curriculum designers, industrial and organizational psychologists, writers, and research-and-development professionals. I could summarize this list by reducing it to five types of readers: lifelong learners, educators, consultants, managers, and psychologists. You will gain insights into improving your personal effectiveness without having to wade through the tedium of academic detail (I've done that for you) or the fluff of wordy popularizers (I've cut away the padding).

This book *is not*

- A biology or medical text
- A psychology text
- An in-depth treatment of specific research findings
- A collection of esoteric findings that are interesting but not useful
- An in-depth treatment of general subjects (I report only the brain research findings that are relevant to the subject)
- A reference work for research scientists

This book *is*

- Application-oriented
- A reflection of my experiences as a management consultant

- Composed of findings that have practical applications
-
- A reference work for consumers
 - Centered on the what and the why: what brain research suggests we could do for personal improvement and why we should do it

The book is designed to be something of an encyclopedia or resource book of application ideas. I suspect that a few people will read it from cover to cover, with most of you preferring to browse according to which sections are of the most current interest to you. Where the understanding of a chapter or topic is particularly dependent on material covered elsewhere in the book, I have attempted to indicate that fact. In order to group the chapters for the convenience of most readers, I have divided the book into seven parts.

Part One serves as an introduction to the field of cognitive science. Chapter 1 provides an overview both of the field of cognitive science and of the book itself; Chapter 2 reviews some of the basics of brain functions; Chapter 3 reviews current thinking about pharmaceuticals and the brain. If you have a strong or recent background in cognitive science, you may choose to skim or skip these first three chapters. Part Two explores brain development and characteristics during the three age ranges of greatest interest—early childhood (Chapter 4), adolescence (Chapter 5), and aging (Chapter 6). Part Three will probably prove to be of the greatest interest for most people, covering findings related to diet, drugs, sleep, exercise, humor, and music. Part Four is designed for the teacher in us all; it discusses how we learn and remember, facilitate learning, and develop language, with a special chapter on giftedness. Part Five shows ways to maximize our creativity and problem-solving ability. Part Six is the most ambitious, as we begin here to take a look at the total person, moving from personality traits and mental abilities, through the emotions and stress, and finally to motivation and happiness. This section will be particularly useful if you are interested in personal growth, personnel selection, parenting, or similarities and differences in personal styles at work and at home. Part Seven, as it were, closes the book with a “prayer” by taking a stab at defining the nature of consciousness, an effort that cannot be undertaken without familiarity with the material leading up to it.

My main purpose in writing this book is to help you discover ways to improve. By giving specific suggestions along with their research justifications, I hope to pique your interest in opportunities for personal improvement. Because the scope is so inclusive, some of you may be frustrated by finding insufficient information on these pages that helps you immediately implement an idea. To solve this problem, I would like to suggest several resources that could be helpful in leading you to further information or skill mastery:

- Talk with your public library’s reference staff.
- Consult the continuing education department of a school of higher education near you.
- Consult officers in your local chapters of the ASTD or the National Society for Performance and Instruction (directories are available in your library).
- Write the authors of books mentioned in a specific topic.
- Explore the Internet resources listed at the end of this book, and conduct your own Internet

keyword searches.

- Read the materials listed at the end of each chapter and in the resources at the end of the book that relate to ideas in which you are interested.

If, in your search to improve your skills, you seek out workshops on a particular subject mentioned in this book, be sure to evaluate the content of the workshop before attending. For example, don't just go to a "motivation" workshop; find out whose theories or work the session is based on. Many workshops today use outmoded information. But that's a subject for another book.

I acknowledge debts to many in writing this fourth edition. The task has grown enormous with the explosion of brain research since the "Decade of the Brain" in the 1990s. I have relied on a research team to help me prepare this edition: Dr. Pam Ey, senior research coordinator; Dr. Mark Ardis, medical research advisor; and Ms. Monica Vergara, education research advisor. Without their assistance in covering the vast amount of brain research that has appeared since the third edition, I could not have completed this Herculean task. Thank you, partners!

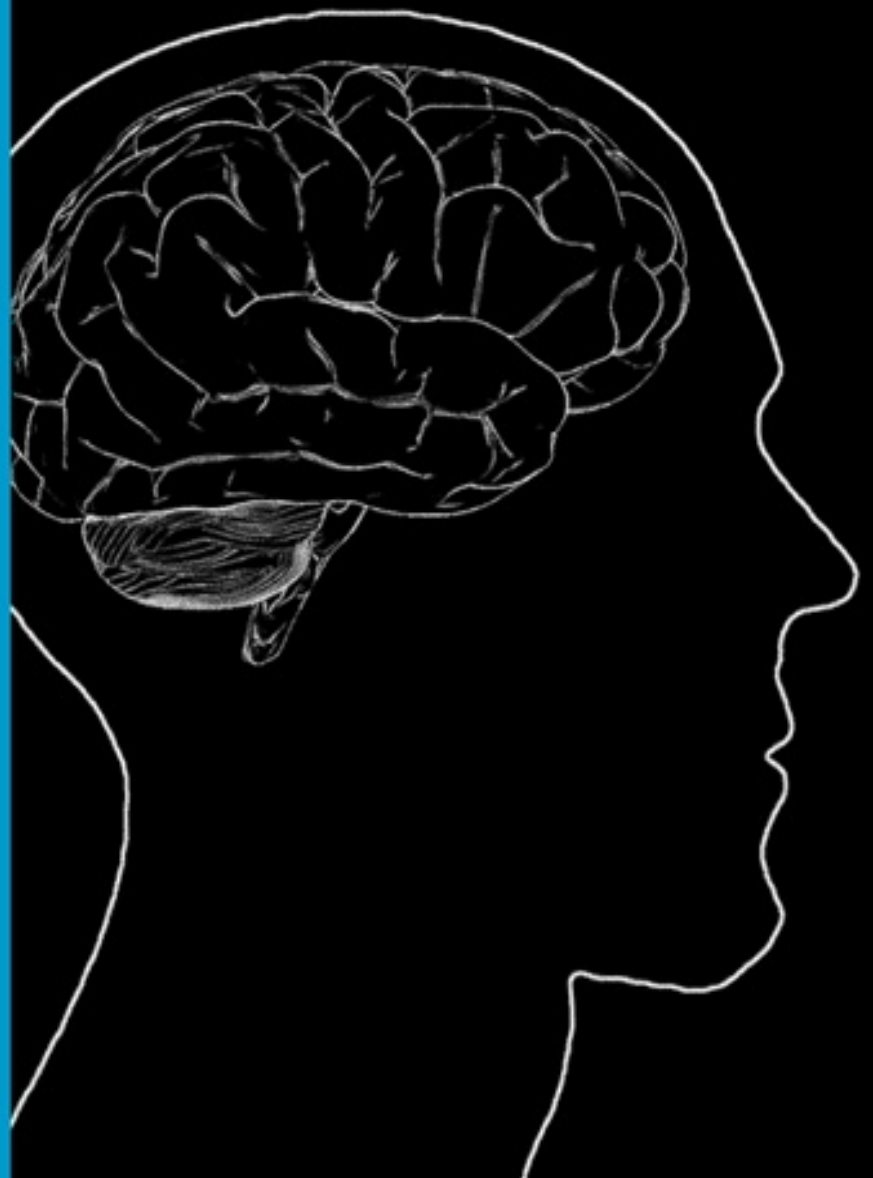
I owe much gratitude to my agents, Ray Bard of Austin, Texas, and Melissa Chinchillo of Fletcher and Company, New York, for placing this fourth edition in the lap of Peter Hubbard, executive editor at William Morrow. Peter has opened the gate for this edition, and his research associate, Cole Hager, has guided me sensitively through the process. Thanks, team!

My inspiration comes from my supportive staff at CentACS; my wife, Jane Mitchell Howard; our daughters, Hilary and Allegra (and their mates, Jy and Will); and our grandchildren, Liam, Rowan, Stella, and A.J. I love you all!

Part One

Forming a Foundation

*The Context
for Using
Your
Owner's
Manual*



Part One. Forming a Foundation

The Context for Using Your Owner's Manual

1. Getting Started

A Framework for Exploring Mind-Brain Concepts

2. Brain Basics

A Refresher Course in Hardware and Hormones

3. The Trouble with Drugs

Of Crutches and Cures

Getting Started

A Framework for Exploring Mind-Brain Concepts

“*Few minds wear out; more rust out.*”

—Christian Nestell Bovee

World War II started something. The pain and tragedy of head injuries catapulted brain research into the foreground of scientific and pseudoscientific investigation. From the popular claims of split-brain research to the profound findings of neurotransmitter studies, discoveries by increasing numbers of researchers and readers have focused on learning how the brain works.

This explosion of research has given birth to a new field of knowledge: *cognitive science*, also known as brain science. One feature that makes this field unique is its interdisciplinary nature—it is made up of more than one traditional field of study. The research has been conducted by investigators from seven broad fields, although some subdivisions of these fields are more germane to cognitive science than others; for example, psychopharmacology is more germane than social psychology. The fields are

1. Biology
2. Chemistry

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