

GLOBAL
EDITION



Forty Studies That Changed Psychology

*Explorations into the History of
Psychological Research*

SEVENTH EDITION

Roger R. Hock

ALWAYS LEARNING

PEARSON

**FORTY STUDIES
THAT CHANGED
PSYCHOLOGY**

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Explorations into the History
of Psychological Research

Global Edition

Seventh Edition

Roger R. Hock, Ph.D.

Mendocino College

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For Diane Perin Hock and Caroline Mei Perin Hock

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PREFACE

Welcome to the seventh edition of *Forty Studies that Changed Psychology*. For over 20 years this book has been a mainstay for many college and high school courses around the world and has been translated into six languages. The majority of the studies included in this edition are the same ones that made up a large part of the first edition. This demonstrates how these landmark studies continue today to exert their influence over psychological thought and research. These original studies and the ones that have been added or changed over the years provide a fascinating glimpse into the birth and growth of the *science of psychology*, and into the insights we have acquired trying to unravel the complexities of human nature.

Many studies of human behavior have made remarkable and lasting impacts on the various disciplines that comprise the vast field of psychology. The findings generated from this research have changed our knowledge of human behavior, and they have set the stage for countless subsequent projects and research programs. Even when the results of some of these pivotal studies have later been drawn into controversy and question, their effect and influence in a historical context never diminish. They continue to be cited in new articles; they continue to be the topic of academic discussion, they continue to form the foundation for hundreds of textbook chapters, and they continue to hold a special place in the minds of psychologists.

The concept for this book originated from my three decades of teaching psychology. Most psychology textbooks are based on key studies that have shaped the science of psychology over its relatively brief history. Textbooks, however, seldom give the original, core studies the attention they richly deserve. The original research processes and findings often are summarized and diluted to the point that little of the life and excitement of the discoveries remain. Sometimes, research results are reported in ways that may even mislead the reader about the study's real impact and influence about what we know and how we know it. This is in no way a criticism of the textbook writers who work under length constraints and must make many difficult choices about what gets included and in how much detail. The situation is, however, unfortunate because the foundation of all of modern psychology is scientific research, and through over a century of ingenious and elegant studies, our knowledge and understanding of human behavior have been expanded and refined to the advanced level of sophistication that exists today.

This book is an attempt to fill the gap between all those psychology textbooks and the research that made them possible. It is a journey through the *headline history* of psychology. My hope is that the way the 40 chosen studies are

presented will bring every one of them back to life so that you can experience them for yourself. This book is intended for anyone, in any course, who wishes a greater understanding of the true roots of psychology.

CHOOSING THE STUDIES

The studies included in this book have been carefully chosen from those found in psychology texts and journals and from those suggested by leading authorities in the many branches of psychology. As the studies were selected, 40 seemed to be a realistic number both from a historical point of view and in terms of length. The studies chosen are arguably among the most famous, the most important, or the most influential in the history of psychology. I use the word *arguably* because many who read this book may wish to dispute some of the choices. One thing is sure: No *single* list of 40 studies would satisfy *everyone*. However, the studies included here stirred up a great deal of controversy when they were published, sparked the most subsequent related research, opened new fields of psychological exploration, changed dramatically our knowledge of human behavior, and continue to be cited frequently. These studies are organized by chapter according to the major psychology branches into which they best fit: *The Biological Basis of Human Behavior*; *Consciousness and the Senses*; *Conditioning and Learning*; *Cognition, Memory, and Intelligence*; *Changes over the Human Lifespan*; *Motivation and Emotion*; *Personality*; *Psychological Disorders*; *Therapy*; and *Human Interaction and Social Behavior*.

PRESENTING THE STUDIES

The original studies themselves are not included in their entirety in this book. Instead, I have discussed and summarized them in a consistent format throughout the book to promote a clear understanding of the studies presented. Each reading contains the following:

1. An exact, readily available reference for where the original study can be found
2. A brief introduction summarizing the background in the field leading up to the study and the reasons the researcher carried out the project
3. The theoretical propositions or hypotheses on which the research rests
4. A detailed account of the experimental design and methods used to carry out the research, including, where appropriate, who the participants were and how they were recruited; descriptions of any apparatus and materials used; and the actual procedures followed in carrying out the research
5. A summary of the results of the study in clear, understandable, nontechnical, nonstatistical, no-jargon language
6. An interpretation of the meaning of the findings based on the author's own discussion in the original article
7. The significance of the study to the field of psychology

8. A brief discussion of supportive or contradictory follow-up research findings and subsequent questioning or criticism from others in the field
9. A sampling of recent applications and citations of the study in others' articles to demonstrate its continuing influence
10. References for additional and updated readings relating to the study

Often, scientists speak in languages that are not easily understood (even by other scientists!). The primary goal of this book is to make these discoveries meaningful and accessible to the reader and to allow you to experience the excitement and drama of these remarkable and important discoveries. Where possible and appropriate, I have edited and simplified some of the studies presented here for ease of reading and understanding. However, this has been done carefully, so that the meaning and elegance of the work are preserved and the impact of the research is distilled and clarified.

NEW TO THE SEVENTH EDITION

This seventh edition of *Forty Studies* offers numerous noteworthy and substantive changes and additions. I have added two of the most influential studies in the history of psychology about how we perceive the world. The first is Eleanor Rosch's revolutionary discovery from 1973 of an ingenious method to allow us to study our brains' categorization of colors. The second is a comparatively recent report on how the human brain is now *literally* visible for research purposed with the use of highly technical instruments, primarily the MRI.

In addition, many of the *Recent Applications* sections near the end of the readings have been updated. These sections sample recent citations of the 40 studies into the 21st century. The 40 studies discussed in this book are referred to in over 1,000 research articles every year! A small sampling of those articles is briefly summarized throughout this edition to allow you to experience the *ongoing* influence of each or more of these 40 studies that changed psychology. All these recently cited studies are fully referenced at the end of each reading along with other relevant sources. As you read through them, you will be able to appreciate the breadth and richness of the contributions still being made today by the 40 studies that comprise this book.

Over the several years since completing the sixth edition, I have continued to enjoy numerous conversations with, and helpful suggestions from, colleagues in many branches of psychological research about potential changes in the selection of studies for this new edition. Two studies I have for some time considered including have been mentioned frequently by fellow researchers, and are in many psychology texts so I have added them to this edition. Each of these two newly incorporated studies, in their own significant ways, expanded our perceptions of two very basic aspects of human nature and added to our knowledge of the complexity and diversity of the human experience.

One of the "newly added" studies in this edition is actually a revisit to a study that was included in the very first edition over 20 years ago. Many

colleagues have told me over the years that it is still too important to be dropped from the book. It is a study conducted by Eleanor Rosch that provided evidence that we are born with “built-in” categories for colors, and that many colors are not learned at all, but instead are accessed by our pre-existing color “prototypes”—already programmed into our brains and passed down to us through evolution. This makes sense when you consider that recognition of colors could play an important role in early humans’ survival and the survival of the human species. Although these early human would not have these color words, the survival value of color may have worked something like this: “Last time I ate that yellow leaf I got really sick, so I’m staying away from it; next time it might kill me!”

The second study added to this new edition is a bit different from the rest in that it is relatively recent (2003), especially in comparison to all the other studies. However, I have included it because it involves a major scientific shift in how we study the human brain and are able to reveal how it functions. This new paradigm has the potential to allow researchers to *watch* your brain function as you carry out mental functions. It might even eventually be able to “see” what you are thinking! The tool that allows us to do this is Magnetic Resonance Imaging (the MRI). The MRI is not particularly new in itself, but researchers are now observing the brains of people *while* they are thinking; *while* they are functioning. This is referred to as the functional MRI or fMRI. This protocol for the MRI is still in the development stages, even today, and its ultimate potential remains controversial. But as you read, you will see the amazing feats the fMRI can, and has, accomplish.

All the studies, regardless of vintage, discussed in the upcoming pages have one issue in common: research ethics. Perhaps the most important building block of psychological science is a strict understanding and adherence to a clear set of professional ethical guidelines in any research involving humans or animals. Let’s consider briefly the ethical principles social scientists work diligently to follow as they make their discoveries.

THE ETHICS OF RESEARCH INVOLVING HUMAN OR ANIMAL PARTICIPANTS

Without subjects, scientific research is virtually impossible. In physics, the subjects are matter and energy; in botany, they are plantlife; in chemistry, they are molecules, atoms, and subatomic particles; and in psychology, the participants are people. Sometimes, certain types of research do not ethically permit the use of human participants, so animal subjects are substituted. However, the ultimate goal of animal research in psychology is to understand human behavior better, not to study the animals themselves. In this book, you will be reading about research involving both human and animal subjects. Some of the studies may cause you to question the ethics of the researchers in regard to the procedures used with the subjects.

When painful or stressful procedures are part of a study, the question of ethics is noted in the chapter. However, because this is such a volatile

and topical issue, a brief discussion of the ethical guidelines followed by present-day psychologists in all research is included here in advance of the specific studies described in this book.

Research with Human Participants

The American Psychological Association (APA) has issued strict and clear guidelines that researchers must follow when carrying out experiments involving human participants. A portion of the introduction to those guidelines reads as follows:

Psychologists strive to benefit those with whom they work and take care to do no harm. In their professional actions, psychologists seek to safeguard the welfare and rights of those with whom they interact. . . . When conflicts occur among psychologists' obligations or concerns, they attempt to resolve these conflicts in a responsible fashion that avoids or minimizes harm. . . . Psychologists uphold professional standards of conduct, clarify their professional roles and obligations, accept appropriate responsibility for their behavior, and seek to manage conflicts of interest that could lead to exploitation or harm. . . . Psychologists respect the dignity and worth of all people, and the rights of individuals to privacy, confidentiality, and self-determination. (excerpted from *Ethical Principles of Psychologists and Code of Conduct*, 2003; see <http://apa.org/ethics>)

Researchers today take great care to adhere to those principles by following basic ethical principles in carrying out all studies involving human participants. These principles may be summarized as follows:

1. *Protection from harm.* This may seem overly obvious to you: Of course researchers have the duty to protect their research participants from harm; don't they? The answer is yes! But this was not always a hard and fast rule. As you will see in a few of the studies in this book, debates have long ensued over whether the rights of the volunteers were violated and whether researchers truly followed the other following guidelines. Moreover, the protection must extend beyond the experiments so that if a participant has any disturbing thoughts later on, he or she may contact the researchers and discuss them.
2. *Informed consent.* A researcher must explain to potential participants what the experiment is about and what procedures will be used so that the individual is able to make an informed decision about whether or not to participate. If the person then agrees to participate, this is called *informed consent*. As you will see in this book, sometimes the true purposes of an experiment cannot be revealed because this would alter the behavior of the participants and contaminate the results. In such cases, when deception is used, a subject still must be given adequate information for informed consent, and the portions of the experiment that are hidden must be both justifiable based on the importance of the potential findings and revealed to the participants at the end of their involvement in the study. In research involving children or minors, parent or guardian consent is required and the same ethical guidelines apply.

3. *Freedom to withdraw at any time.* Part of informed consent is the principle that all human participants in all research projects must be aware that they may withdraw freely from the study at any time. This may appear to be an unnecessary rule, because it would seem obvious that any subject who is too uncomfortable with the procedures can simply leave. However, this is not always so straightforward. For example, undergraduate students are often given course credit for participating as participants in psychological experiments. If they feel that withdrawing will influence the credit they need, they may not feel free to do so. When participants are paid to participate, if they are made to feel that their completion of the experiment is a requirement for payment, this could produce an unethical inducement to avoid withdrawing if they wish to do so. To avoid this problem, participants should be given credit or paid at the beginning of the procedure *just for showing up*.
4. *Confidentiality.* All results based on participants in experiments should be kept in complete confidence unless specific agreements have been made with the participants. This does not mean that results cannot be reported and published, but this is done in such a way that individual data cannot be identified. Often, no identifying information is even acquired from participants, and all data are combined to arrive at *average* differences among groups.
5. *Debriefing.* Most psychological research involves methods that are completely harmless, both during and after the study. However, even seemingly harmless procedures can sometimes produce negative effects, such as frustration, embarrassment, or concern. One common safeguard against those effects is the ethical requirement of debriefing. After participants have completed an experiment, especially one involving any form of deception, they should be debriefed. During debriefing, the true purpose and goals of the experiment are explained to them, and they are given the opportunity to ask any questions about their experiences. If there is any possibility of lingering aftereffects from the experiment, the researchers should provide participants with contact information if participants might have any concerns in the future.

As you read through the studies included in this book, you may find a few studies that appear to have violated some of these ethical principles. Those studies were carried out long before formal ethical guidelines existed and the research could not be replicated under today's ethical principles. The lack of guidelines, however, does not excuse past researchers for abuses. Judgment of those investigators and their actions must now be made by each of us individually, and we must learn, as psychologists have, from past mistakes.

Research with Animal Subjects

One of the hottest topics of discussion inside and outside the scientific community is the question of the ethics of animal research. Animal-rights groups are growing in number and are becoming increasingly vocal and militant.

More controversy exists today over animal subjects than human participants, probably because animals cannot be protected, as humans can, with informed consent, freedom to withdraw, or debriefing. In addition, the most radical animal rights activists take the view that all living things are ordered in value by their ability to sense pain. In this conceptualization, animals are equal in value to humans and, therefore, any use of animals by humans is seen as unethical. This use includes eating a chicken, wearing leather, and owning pets (which, according to some animal-rights activists, is a form of slavery).

At one end of the spectrum, many people believe that research with animals is inhumane and unethical and should be prohibited. However, nearly all scientists and most Americans believe that the limited and humane use of animals in scientific research is necessary and beneficial. Many lifesaving drugs and medical techniques have been developed through the use of animal experimental subjects. Animals have also often been subjects in psychological research to study issues such as depression, brain development, overcrowding, and learning processes. The primary reason animals are used in research is that to carry out similar research on humans clearly would be unethical. For example, suppose you wanted to study the effect on brain development and intelligence of raising infants in an enriched environment with many activities and toys, versus an impoverished environment with little to do. To assign human infants to these different conditions would simply not be possible. However, most people would agree that rats could be studied without major ethical concerns to reveal findings potentially important to humans (see Reading 2 on research by Rosenzweig and Bennett).

The APA, in addition to its guidelines on human participants, has strict rules governing research with animal subjects that are designed to ensure humane treatment. These rules require that research animals receive proper housing, feeding, cleanliness, and health care. All unnecessary pain to the animal is prohibited. A portion of the APA's *Guidelines for the Ethical Conduct in the Care and Use of Animals* (2004) reads as follows:

Animals are to be provided with humane care and healthful conditions during their stay in the facility. . . . Psychologists are encouraged to consider enriching the environments of their laboratory animals and should keep abreast of literature on well-being and enrichment for the species with which they work. . . . When alternative behavioral procedures are available, those that minimize discomfort to the animal should be used. When using aversive conditions, psychologists should adjust the parameters of stimulation to levels that appear minimal, though compatible with the aims of the research. Psychologists are encouraged to test painful stimuli on themselves, whenever reasonable. (see <http://apa.org/science/anguide.html>)

In this book, several studies involve animal subjects. In addition to the ethical considerations of such research, difficulties also arise in applying findings from animals to humans. These issues are discussed in this book within each reading that includes animal research. Each individual, whether a researcher or a student of psychology, must make his or her own decisions about animal research in general and the justifiability of using animal subjects in any specific instance. If you allow for the idea that animal research is acceptable under *some*

circumstances, then, for each study involving animals in this book, you must decide if the value of the study's findings supports the methods used.

One final note related to this issue of animal subjects involves a development that is a response to public concerns about potential mistreatment. The city of Cambridge, Massachusetts, one of the major research centers of the world and home to institutions such as Harvard University and the Massachusetts Institute of Technology (MIT), has led the way by creating the position of *Commissioner of Laboratory Animals* within the *Cambridge Health Department* (see <http://www.cambridgepublichealth.org/services/regulatory-activities/lab-animals>). This was the first such governmental position in the United States. Cambridge, and the many research universities there, is home to 44 laboratories that house over 200,000 animals. The commissioner's charge is to ensure humane and proper treatment of all animal subjects in all aspects of the research process, from the animals' living quarters to the methods used in administering the research protocols. If a lab is found to be in violation of Cambridge's strict laws concerning the humane care of lab animals, the commissioner is authorized to impose fines of up to \$300 per day. As of this writing, only one such fine has been imposed; it amounted to \$40,000 (for 133 days in violation) on a facility that appeared to have deliberately disregarded animal treatment laws (Dr. Julie Medley, Commissioner of Laboratory Animals, e-mail, April 15, 2012). In all other cases, any facility that has been found in violation has willingly and quickly corrected the problem. The studies you are about to experience in this book have benefited all of humankind in many ways and to varying degrees. The history of psychological research is a relatively short one, but it is brimming with the richness and excitement of discovering human nature.

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To my family, my friends, and my students who have participated in the history of this book in so many tangible and intangible ways over the past 20+ years (you know who you are), I extend my continuing best wishes and heartfelt thanks.

ROGER R. HOCK

THE BIOLOGICAL BASIS OF HUMAN BEHAVIOR

Reading 1 ONE BRAIN OR TWO?

Reading 2 MORE EXPERIENCE = BIGGER BRAIN

Reading 3 ARE YOU A “NATURAL”?

Reading 4 WATCH OUT FOR THE VISUAL CLIFF!

Nearly all general psychology texts begin with chapters relating to the biology of human behavior. This is due not simply to convention but rather because basic biological processes underlie *all* behavior. The various branches of psychology rest, to varying degrees, on this biological foundation. The area of psychology that studies these biological functions is typically called *psychobiology* or *biological psychology*. This field focuses on the actions of your brain and nervous system, the processes of receiving stimulation and information from the environment through your senses, the ways your brain organizes sensory information to create your perceptions of the world, and how all of this affects your body and behavior.

The studies chosen to represent this basic component of psychological research include a wide range of research and are among the most influential and most often cited. The first study discusses a famous research program on right-brain/left-brain specialization that shaped much of our present knowledge about how the brain functions. Next is a study that surprised the scientific community by demonstrating how a stimulating “childhood” might result in a more highly developed brain. The third study represents a fundamental change in the thinking of many psychologists about the basic causes of human behavior, personality, and social interaction—namely, a new appreciation for the significance of your *genes*. Fourth is the invention of the famous *visual cliff* method of studying infants’ abilities to perceive depth. All these studies, along with several others in this book, also address an issue that underlies and connects nearly all areas of psychology and provides the fuel for an ongoing and fascinating debate: the nature–nurture controversy.

Reading 1: ONE BRAIN OR TWO?

Gazzaniga, M. S. (1967). The split brain in man. *Scientific American*, 217(2), 24–29.

You are probably aware that the two halves of your brain are not the same and that they perform different functions. For example, in general the left side of your brain is responsible for movement in the right side of your body, and