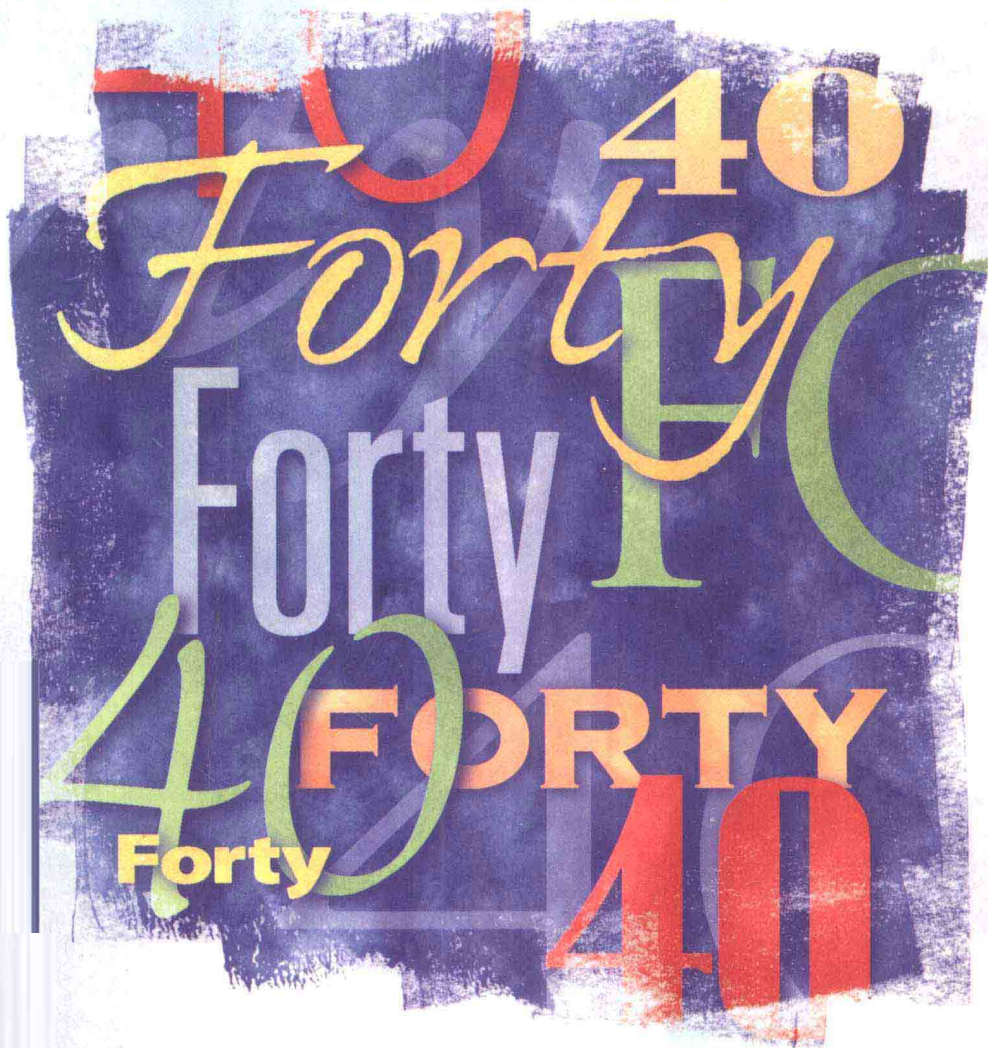


# FORTY STUDIES CHANGED PSYCHO

Explorations Into the History of Psychological Research

THIRD EDITION



ROGER R. HOCK

# FORTY STUDIES THAT CHANGED PSYCHOLOGY

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Explorations into the History  
of Psychological Research

Third Edition

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# PREFACE

Science moves through history in many ways and at many speeds. There are slow times, all too frequently, when it seems to stagnate, making little or no progress. Then there are those exciting, dynamic periods when new discoveries spark waves of dialog, attention, research, and progress. These discoveries quite literally change what we know about how the world works. The history of psychology is no different from the other sciences. There has been psychological research that has had remarkable and lasting effects on the various disciplines that comprise the science we call psychology. The findings generated from these studies 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 diminishes. They continue to be cited in new articles; they continue to be the topic of academic discussion; they continue to form the foundation for textbook chapters; and they continue to hold a special place in the minds of psychologists.

The concept for this book grew out of my many years of teaching psychology. Psychology textbooks are based on many key studies that have shaped the science of psychology over its relatively brief history. Textbooks, however, seldom give the original studies themselves the attention they richly deserve. Usually the research processes are summarized and diluted to the point that little of the life and excitement of the discoveries remain. Sometimes the way the methods and findings are reported can even mislead the reader about the study's true impact and influence. This is in no way a criticism of the textbook writers who work under length constraints and must make many difficult choices as to what gets included and in how much detail. The situation is, however, unfortunate, since the foundation of all of psychology is research, and it is through a century of ingenious and elegant studies that our knowledge and understanding of human behavior have been expanded and refined to the level of sophistication that exists today.

This book is an attempt to fill the rather large gap between the 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 forty chosen studies are presented will bring them back to life so that you can experience them for yourself. This book is intended for anyone who wishes a greater understanding of the true roots of psychology.

## CHOOSING THE STUDIES

The studies included in this book were carefully chosen from those found in psychology texts and journals and from those suggested by leading authorities in psychology's many subfields. The number wasn't planned, but as the studies were selected, forty seemed to be about right both from a historical point of view and in terms of length. The studies chosen are arguably the most famous, the most important, or the most influential in the history of psychology. I use the word "arguably" since many who read this book may wish to dispute some of the choices. One thing is sure: There is no single list of forty studies that would satisfy everyone. However, the studies included here are the ones that continue to be cited most frequently, stirred up the most controversy when they were published, sparked the most subsequent related research, opened new fields of psychological exploration, and changed most dramatically our knowledge of human behavior. These studies are organized according to the subfield into which they best fit, including Biology and Human Behavior; Consciousness; Learning and Conditioning; Intelligence, Cognition, and Memory; Human Development; Emotion and Motivation; Personality; Psychopathology; Psychotherapy; and Social Psychology.

## PRESENTING THE STUDIES

A basic format is used consistently throughout the book to promote a clear understanding of each study presented. Each chapter contains:

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 subjects 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, non-technical, 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 to demonstrate its continuing influence.
10. References for additional and updated reading 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, to allow you to experience the excitement and drama of these remarkable and important discoveries. Where possible and appropriate, the studies presented here have been simplified and edited for ease of reading and understanding. However, this has been done in such a way that the meaning and elegance of the work is preserved and the impact of the research is distilled and clarified.

This third edition of *Forty Studies* has been revised in significant and substantive ways. No compelling arguments for adding or dropping specific studies came to my attention since the release of the second edition, therefore the forty selections remain unchanged. The major revisions have centered primarily in the “Recent Applications” sections near the end of each study. These segments have been thoroughly updated to reflect the numerous citations of each of the original forty studies in articles appearing in professional scientific journals during the three years since the publication of the second edition (1995–1997). The findings of over 100 new studies from those three years are briefly summarized to allow the *ongoing* influence of the forty studies that changed psychology to be felt. These new studies are fully referenced at the end of each chapter. As you read through them, you will be able to appreciate the breadth and richness of the contributions still being made by the forty studies that comprise this book.

Another new feature in this edition is the launching of *Forty Studies* on the Internet. *Forty Studies That Changed Psychology* can be visited at [www.prenhall.com/hock](http://www.prenhall.com/hock), where you will find engaging and useful information about the book, the author, the publisher, the studies, and the researchers. This site will connect the reader to authoritative and reliable sites relating to each study’s author, the study itself, or the topic that is central to the study. Most of these sites contain hyperlinks to many other relevant and informative Internet locations. The site is constantly being enhanced and updated so frequent visits are recommended.

## THE ETHICS OF RESEARCH INVOLVING HUMAN OR ANIMAL SUBJECTS

Without subjects, there is virtually no scientific research possible. In physics, the subjects are subatomic particles; in botany, they are plants; in chemistry, they are the elements of the periodic table; and in psychology, the subjects are people. At times certain research procedures or behaviors under study do not permit the use of human subjects, so animal subjects are substituted. However, the goal of animal research is to better understand humans, not the animals themselves. In the following pages, 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. Usually, when painful or stressful procedures are part of a study being discussed, the question of ethics will be noted in the chapter. However, since this is such a volatile and topical issue, a brief discussion of the ethical guidelines followed by present-day psychologists is included here in preparation for some of the studies described in this book.

### **Research with Human Subjects**

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 respect the dignity and worth of the individual and strive for the preservation and protection of fundamental human rights. They are committed to increasing knowledge of human behavior and of people's understanding of themselves and others and to the utilization of such knowledge for the promotion of human welfare. While pursuing these objectives, they must make every effort to protect the welfare . . . of the research participants that may be the object of study. [from American Psychological Association. (1981). Ethical principles of psychologists. *American Psychologist*, 36, 633–638]

In order to adhere to those principles, researchers follow certain basic rules for all studies involving human subjects:

1. *Informed consent.* A researcher must explain to potential subjects what the experiment is about and what procedures will be used so that the individual is able to make an informed decision whether to participate. If the person then agrees to participate, this is called “informed consent.” There are times, as you will see in this book, when the true purposes of an experiment cannot be revealed because this would alter the behavior of the subjects 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 justifiable based on the importance of the potential findings.
2. *Freedom to withdraw at any time.* All human subjects in all research projects must know that they may withdraw freely from the experiment at any time. This may seem an unnecessary rule, since 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 subjects in psychological experiments. They may feel that withdrawing will influence the credit they receive and they will

not, therefore, feel free to do so. When subjects 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 when they wish to do so. To avoid this problem, subjects should be given credit or paid at the beginning of the procedure “just for showing up.”

3. *Debriefing and protection from harm.* Experimenters have the responsibility to protect their subjects from all physical and psychological harm that might be produced by the research procedures. 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 for debriefing. After subjects 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 subjects with their phone numbers for further discussion if necessary.
4. *Confidentiality.* All results from subjects in experiments should be kept in complete confidence unless specific agreements have been made with the subjects. 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 subjects, and all data are combined to arrive at average differences among groups.

In research involving children, parental consent is required and the same ethical guidelines apply.

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. These studies were carried out long before formal ethical guidelines existed and could not be replicated today. The lack of guidelines, however, does not excuse past researchers for abuses. Judgment of those investigators 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 in and outside of 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. There is more controversy today over animal subjects than human subjects, probably because animals cannot be protected, as humans can, with



informed consent, freedom to withdraw, or debriefing. Additionally, 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 would be clearly 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 vs. 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 the reading in this book on research such as this by Rosenzweig and Bennett).

The American Psychological Association, in addition to its guidelines on human subjects, has strict rules governing research with animal subjects 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 "Care and Use of Animals" reads as follows:

Psychologists make every effort to minimize discomfort, illness, and pain of animals. A procedure subjecting animals to pain, stress, or privation is used only when an alternative procedure is unavailable and the goal is justified by its prospective scientific, educational, or applied value. [from American Psychological Association. (1981). Ethical principles of psychologists. *American Psychologist*, 36, 633–638]

In this book, there are several studies involving animal subjects. In addition to the ethical considerations of such research, there are also difficulties in generalizing from animal findings to humans. These issues are discussed within each chapter 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 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 support the methods used.

One final note related to this issue involves a development in animal research that is a response to public concerns about potential mistreatment. The city of Cambridge, Massachusetts, one of the major research centers of the world with institutions such as Harvard University and M.I.T., has created the position of *Commissioner of Laboratory Animals* within their Department of Health and Hospitals. This is the first such government position and is currently held by a veterinarian, Dr. Julie Medley. Cambridge contains 22 research laboratories that house approximately 60,000 animals of many types. 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 (see *People* magazine, May 27, 1991, p. 71).

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 filled with the richness and excitement of discovering human nature.

## ACKNOWLEDGMENTS

I would like to express my sincere gratitude to Charlyce Jones Owen, Editorial Director of the Humanities and Social Sciences Division at Prentice Hall, for her commitment to and support of this project from the beginning. I am also grateful to Bill Webber, Executive Editor of Prentice Hall's psychology list, for his invaluable support, and Assistant Editor Jennifer Hood's excellent overall supervision of this third edition. I extend many thanks to Nancy Marcus Land at Publications Development Company of Texas for her insightful, accurate, and supportive design, production, and copy editing of the third-edition manuscript. I would also like to offer my appreciation and admiration to Bruce Kenselaar for his talented and creative cover design on the second and third editions, and to Michael Alread, Senior Marketing Manager at Prentice Hall, for his enthusiastic promotion of this book in an ever-widening range of markets. Finally, I would like to convey my thanks and best wishes to all my students, friends, and colleagues at New England College in New Hampshire who participated in the history of this book in many tangible and intangible ways over the past nine years.

ROGER R. HOCK

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# 1 BIOLOGY AND HUMAN BEHAVIOR

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Nearly all general psychology texts begin with chapters relating to the biology of human behavior, and this book does so as well. This is not simply due to convention or convenience, but rather it is because biological or physiological processes form the basis of all behavior. Each of the other subfields of psychology rests on this biological foundation. The branch of psychological research that studies these processes is called *physiological* or *biological psychology*, and focuses on the interaction of your brain and nervous system, the processes of receiving stimulation and information from the environment around you through your senses, and the ways in which your brain organizes all this information to create your perceptions of the world.

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 of how the brain functions. Next is a study that surprised the scientific community by demonstrating how a stimulating “childhood” might produce a more highly developed brain. The third study takes us to a far-away culture to reveal how our perceptions of the world around us are shaped by a lifetime of specific sensory input. And fourth is the invention of the famous “visual cliff” method of studying infants’ abilities to perceive depth. All these studies, the latter two in particular, also address an issue that underlies and connects nearly all areas of psychology and provides for an ongoing and fascinating debate: the nature-nurture controversy.

## ONE BRAIN OR TWO?

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

You are probably aware that the two halves of your brain are not the same and that they perform different functions. For one thing, the left side of

your brain is responsible for movement in the right side of your body, and vice versa. Even beyond this, though, the two brain hemispheres appear to have even greater specialized abilities.

It has come to be rather common knowledge that, for most of us, the left brain controls the ability to use language while the right is involved more in spatial relationships, such as those needed for artistic activities. It is well known that stroke or accident victims who suffer damage to the left side of the brain will usually lose their ability to speak (often this skill returns with practice and training). Many people believe that each half, or “hemisphere,” of your brain may actually be a completely separate mental system with its own individual abilities for learning, remembering, perceiving the world, and even feeling emotions.

These ideas have become extremely popular, as evidenced by best-selling nonscientific books such as *Drawing on the Right Side of Your Brain* (Edwards, 1979). But the concepts underlying this popular awareness are the result of many years of rigorous scientific research on the effects of splitting the brain in two: on hemispheric specialization.

Research in this area was pioneered by Roger W. Sperry (1913–1994), beginning about 15 years prior to the article examined in this chapter. In his early work with animal subjects, Sperry made many remarkable discoveries. For example, consider a cat that has had surgery to cut the connection between the two halves of its brain and to alter its optic nerves so that its left eye only transmitted information to the left hemisphere and the right eye only to the right hemisphere. Following surgery, the cat appeared to behave normally and exhibited virtually no ill effects. Then the cat’s right eye was covered and the cat learned a new behavior, such as walking through a short maze to find food. After the cat became skilled at maneuvering through the maze, the eye cover was shifted to its left eye. Now when the cat was placed in the maze, its left brain had no idea where to turn and the animal had to relearn the entire maze from the beginning.

Sperry conducted many related studies over the next 30 years and in 1981 received the Nobel Prize for his work on the specialized abilities of the two halves of the brain. When his research endeavors turned to human subjects in the early 1960s, he was joined in his work by Michael Gazzaniga. Although Sperry is considered the founder of split-brain research, Gazzaniga’s article has been chosen because it is a clear, concise summary of their early collaborative work with human subjects and is cited consistently in nearly all general psychology texts. Its selection is in no way intended to overlook or overshadow either Sperry’s leadership in this field or his great contributions. Gazzaniga, in large part, owes his early research, and his ongoing leadership in the area of hemispheric specialization, to Roger W. Sperry (see Sperry, 1968).

In order to understand split-brain research, some knowledge of human physiology is required. The two hemispheres of your brain are in constant



communication with one another via the corpus callosum, a structure made up of about 200 million nerve fibers. If your corpus callosum is cut, this major line of communication is disrupted and the two halves of your brain must then function independently. So, if we want to study each half of your brain separately, all we need to do is surgically sever your corpus callosum.

But can scientists divide the brains of humans? This sounds like psychology à la Dr. Frankenstein! Obviously, research ethics would never allow such drastic methods simply for the purpose of studying the specialized abilities of the brain's two hemispheres. However, in the late 1950s, the field of medicine provided psychologists with a golden opportunity. In some people with very rare and very extreme cases of uncontrollable epilepsy, seizures could be virtually eliminated by surgically severing the corpus callosum. This operation was (and is) extremely successful, as a last resort, for those patients who cannot be helped by any other means. When this article was written in 1966, there had been ten such operations, and four of the patients had consented to participate in examination and testing by Sperry and Gazzaniga to determine how their perceptual and intellectual skills were affected as a result of this surgical treatment.

## **THEORETICAL PROPOSITIONS**

The researchers wanted to explore the extent to which the two halves of the human brain are able to function independently, and whether they have separate and unique abilities. If the information traveling between the two halves of your brain is interrupted, would the right side of your body suddenly be unable to coordinate with the left? If language is controlled by the left side of the brain, how would your ability to speak and understand words be affected by this surgery? Would thinking and reasoning processes exist in both halves separately? If the brain is really two separate brains, would a person be capable of functioning normally when these two brains are no longer able to communicate? Since we receive sensory input from both the right and the left, how would the senses of vision, hearing, and touch be affected? Sperry and Gazzaniga would attempt to answer these and many other questions in their studies of split-brain individuals.

## **METHOD**

There were three different types of tests developed to explore a wide range of mental (cognitive) capabilities of the patients. One was designed to examine visual abilities. A technique was devised so that a picture of an object, a word, or parts of words could be transmitted only to the visual area (called a "field") in either the right- or left-brain hemisphere, and not to both. It should be noted that, normally, both of your eyes send information to both sides of your brain. However, with exact placement of items or words in front of you, and with your eyes fixed on a specific point, images can be fed to only the right or the left visual field of your brain.