Lary Shaffer
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RESEARCH STORIES FOR *Introductory* PSYCHOLOGY

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PREFACE

The goal of this book is to help you to see psychological studies in a larger scientific context and to understand the reasoning that underpins the structures of these studies. We do not believe that introductory students need to be protected from the procedures of scientific psychology. Our approach is to explain research methods as important parts of the stories of contemporary research studies. In order to think critically, you need to know that the findings of psychology are tightly laced to the methods: it makes little sense to talk about one without the other. By reading about both scientific methodology and the findings derived from it, you can come to appreciate what scientific psychology is really about. You will see that the results of studies discussed in this book may contradict the kinds of commonsense guesses about behavior that permeate the pop psychology of television, the Internet, magazines, and newspapers.

Although the research stories in this book have been retold, they have not been dumbed down. You will find appropriate levels of challenge as you master the material. Some details have been eliminated. Other detailed notions, required for understanding by the beginning student, have been introduced or expanded. Moreover, scientifically terse introductions and procedures have been more fully explicated, and statistical analyses have been reduced to understandable dimensions.

Sometime when you have a few minutes, you should go to the library and look at one or more of the original research articles that have been discussed in this book. Each primary reference is found in a footnote on the first page of the chapter. It might interest you to know how much editing and rewriting have been done in bringing this material to you.

While reading these chapters, you will see the gears and wheels of the process that generates knowledge about behavior. You must understand the methodological processes in order to be able to critically assess the validity of assertions about behavior. The kind of critical thinking you will develop with this book is a set of highly transferable skills. Critical thinking is essential for you in the job market or as a graduate school applicant.

Psychology is unique among the disciplines in the broad applicability of the skills you should learn. It is probably safe to say that all of you will be required to evaluate assertions about human behavior as part of your adult lives. Particularly in the age of the Internet, professional advancement will go to the person who can evaluate information. The World Wide Web is packed with information about human behavior. That information is only as good as the research methods that underlie it. The winning skill in the next century will be the ability to sort information along a continuum of quality or accuracy.

At the very least, when you are finished with these readings we hope that you will critically challenge assertions about behavior. Your first question should be, "Who found that out and what methods did they use?" Once you have answers, you can use your knowledge of methods to assess the validity of claims about behavior. The tool kit

of skills you will get from this book can go with you not only to other courses, but also, more importantly, out into the world. The studies in this book are examples of good, contemporary psychological science. Because these stories are real science, they have flaws, limitations, and shortcomings. No study is perfect. Any study can be criticized, and one of our goals for an introductory course is to take you along with us while studies are critically examined for strong and weak points. Our experience suggests that this activity will leave you with a mature and practical grasp of psychology. We do not want you to accept findings uncritically. Instead, we want you to understand that a well-designed study is a powerful way to gather knowledge, even if there are practical limitations within the methods. The "facts" in any science are certain to change over time, but the ability to evaluate these facts is of lasting value.

You should be aware that this book consistently offers a scientific viewpoint about psychology. We believe that science is the most powerful method yet developed for establishing a confident understanding of behavior. We think a great disservice would be done to you if we were not steadfast in our commitment to science.

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While we have been working on the book, several of our colleagues have been willing to adopt it for use in their classes. Dr. Renee Bator, at SUNY Plattsburgh, as well as Dr. G. Terry Bergen, Dr. John Klein, and Ms. Julie Volkens, at Castleton State College, Castleton, Vermont, have used it in duplicated draft form since the beginning. In the past year it was also adopted by the Psych 1 staff at the University of Vermont: Dr. Justin Joffee, Dr. James Rosen, Mr. Joshua Cooper, Ms. Julianne Krulewitz, and Mr. David S. Henehan. The experience and comments of these supportive and enthusiastic scholars have made this a better book and we are very grateful to them. We are also grateful to Gordon D. Atlas, Alfred University; George T. Bergen, Castleton State College; Terry D. Blumenthal, Wake Forest University; James F. Calhoun, University

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We are eager to have your reactions so that we may continue to improve the book. Please feel free to write, phone, or email us at any time: Lary Shaffer: Department of Psychology, SUNY—Plattsburgh, 101 Broad Street, Plattsburgh, NY 12901, 518-564-3383, lawrence.shaffer@plattsburgh.edu; Matthew Merrens: Department of Psychology, SUNY—Plattsburgh, 101 Broad Street, Plattsburgh, NY 12901, 518-564-3379, matthew.merrens@plattsburgh.edu.

ABOUT THE AUTHORS

Lary Shaffer (D. Phil., Oxford University) is a State University of New York Distinguished Teaching Professor at SUNY—Plattsburgh. He is a recipient of the SUNY Chancellor's Award for Excellence in Teaching and has taught courses in introductory psychology, developmental psychology, and animal behavior since 1975. He is currently working on a new book of research stories that will be used to teach life span development.

Matthew R. Merrens (Ph.D., University of Montana) is professor of psychology at SUNY—Plattsburgh. He formerly served as chair of the psychology department at SUNY—Plattsburgh and is a recipient of the SUNY Chancellor's Award for Excellence in Teaching. He has edited four books on introductory psychology, developmental psychology, social psychology, and personality.

CONTENTS

CHAPTER 1

OH RATS!

If you ask most people, they will tell you that a psychology course is supposed to teach you to analyze peoples' minds. As a demonstration we are going to try to analyze your mind. This reading describes an experiment about rats. Now, here is what is on your mind:

> "Rats! *Rats?* Let's see, (flip, flip, flip) how long *is* this chapter, anyway?"
>
> or
>
> "Rats! *Rats?* I wonder if the bookstore would still give me all my money back if I sold this stupid book and dropped this course. After all, the book has hardly been used."
>
> or
>
> "Rats! *Rats?* This is probably just some junk they put in the first chapter. The rest of the book must be about the unconscious and interesting stuff like that."
>
> or
>
> "Rats! *Rats?* Damn! I thought that this was going to be a cool course and now, one page into it, I am reading about **RATS.**"

Did we read your mind? If we did, it was because we have common sense, rather than because we know about psychology. If we didn't, it shows that psychologists cannot read minds. Either way, there is no evidence here for mind reading. Hold that thought. You have only been reading this book for two minutes and you already may have learned something: people who tell you that they can read your mind are not psychologists. Psychologists know better than to say things like that.

Psychologists study behavior. Sometimes a lot can be learned about behavior from the study of rats. This chapter is really about behavior, not rats. Okay, so we lied when we implied that this chapter was about rats. If you were inclined to believe everything found in textbooks, then you have learned something else: textbooks sometimes lie. We will not lie to you (again) on purpose, but we may well lie accidentally. Psychology is a vital discipline and, as such, it is changing all the time. Although we intend to describe psychology as it is today, new research may alter current concepts, theories, or beliefs at any time.

Incorporating the research of C. Kim, L. Kalynchuk, T. Kornecook, D. Mumby, N. Dadgar, J. Pinel, and J. Weinberg, "Object-Recognition and Spatial Learning and Memory in Rats Prenatally Exposed to Ethanol," 1997, *Behavioral Neuroscience, 111*, pp. 985–995.

STUDYING RATS

Because psychologists usually study behavior, rather than a particular organism, not all research in psychology involves the study of human beings. Sometimes other animals are used because the researcher really wants to know about the behavior of that animal, often to answer questions about its evolution or ecology. In other cases, nonhuman animals are used as participants because they are more convenient. Many studies of learning have used rats because they were economical to maintain in large animal colonies that have rows and rows of drawerlike cages. The researcher who could use rats as participants had easy access to research participants from the animal colonies that used to be part of psychology departments in most universities. The behavior under investigation in basic studies of learning can sometimes be so similar from species to species that it does not matter what type of animal is studied. Nonhuman animals have also been the participants of choice when researchers believed that a study was too dangerous for human participants. In this case, the researchers may want to know about humans, but believe that other animals are sufficiently similar to permit their findings to be applied to humans. The experiment with rats to be discussed below was one of these important investigations in which humans could not be used as research participants.

AN EXPERIMENT

In this book, we will use the word *experiment* in a very restricted and special sense. When most people speak of an experiment, they are talking about unsystematically trying something, as in: "I'm going to do an experiment to see if dogs like carrots." You toss the dog a piece of carrot. If he eats it, dogs are presumed to like carrots and if he spits it out, they dislike them. *One* dog in *one* state of hunger with *one* piece of carrot does not tell us much of anything about dogs and carrots. Alternatively, someone might say "I am going to do an experiment to see what will happen if I go to bed early tonight." Aside from all the problems of drawing conclusions based on one person doing something on one day, there is the additional problem that no particular outcome has been anticipated. In a real experiment, there is a clear statement about what is expected to happen as a result of the procedures. The experiment is a test of the correctness of this statement, called the *hypothesis*. In the example of going to bed early, there is no hypothesis. Nothing is being tested, so nothing important is likely to be learned. Going to bed early might be accompanied by a variety of outcomes, such as getting more sleep and feeling rested or waking up earlier and feeling tired the next day. In any event, there is little basis for the conclusion that going to bed early caused either of these—they might easily have happened regardless of bedtime.

C. Kwon Kim and a number of colleagues (Kim et al., 1997) did an experiment to demonstrate the effects of learning in rats that had been exposed to alcohol. We have chosen to discuss this particular study because of the importance of the question. In addition, it has the structural characteristics of a well-conducted experiment. First, we are going to do an overview of this experiment and then we will go back and highlight the features that permit this study to belong to the rarefied and elite class of research called the experiment. As with other studies discussed in this book, this one is impor-

tant for its findings, but it is also important for its methods. For reasons that will become clear, not every scientific study can have all the procedural elements that are part of the experiment reported by Kim et al. (1997). Each of these elements is important to ensure that the conclusions drawn from the study are accurate.

THIS EXPERIMENT

Kim and coworkers obtained both female and male rats of a well-known genetic strain from a breeder. Because rats from the same strain are genetically quite similar, the differences found in the experiment were not likely to be the result of some genetic differences among the sample of rats in the study. The rats were all maintained in cages in a room that had controlled temperature and lighting. Here, again, an effort was made to avoid differences that might affect the outcome of the study. The males and females were housed together until the females became pregnant. Pregnancy in rats is indicated by the loss of a mucous vaginal plug. When the females lost this plug, it was known that they were on Day 1 of their pregnancy, and they were moved to individual cages.

At this point, each female was randomly assigned to one of three groups. Group E was fed a totally liquid diet—a sort of liquid rat chow—which contained adequate food but derived 36 percent of the calories from ethanol. Ethanol is the same kind of alcohol that is in beer, wine, and other alcohol-containing drinks. There were 21 rats in group E. A second group was called the *pair-fed*, or PF, group. This group was fed throughout pregnancy on a liquid diet that was the same as that of Group E, except that a sugarlike substance, maltose-dextrin, was substituted for the alcohol in their diets. This group was called pair-fed because each rat in this group was fed the same amount of liquid food (in grams per kilogram of body weight) as one of the Group E animals. Through its own consumption, each Group E animal determined how much a Group PF animal would be allowed to eat. In this way these two groups were directly comparable except that one group had alcohol as part of every meal and one did not. A third group of 21 pregnant females, Group C, for *control*, was fed usual rat food and water. The special diets of Group E and Group PF were replaced with standard rat chow and water on Day 22 of gestation. The rat pups were born on about Day 23.

There were no differences among the three groups of rats in the number of live or stillborn offspring. On the day following birth, Group E and PF pups weighed less than Group C pups, but they caught up on subsequent days. By the time of birth, Group PF mothers weighed less than Group E or C mothers, but not alarmingly less. The weights of these mothers caught up and they were not different by Day 15 after birth. Their mothers raised all the pups until they were weaned at 22 days old. Then the pups were group housed by litter and sex until testing began. One male rat from each litter was randomly selected for testing. These rats were called the *participants*. When the participants were 16 months old, their learning was tested in a maze task.

The Test Situation

Two different tests were conducted on these rats. One of these involved a visual discrimination task that we will not discuss further because it showed no significant