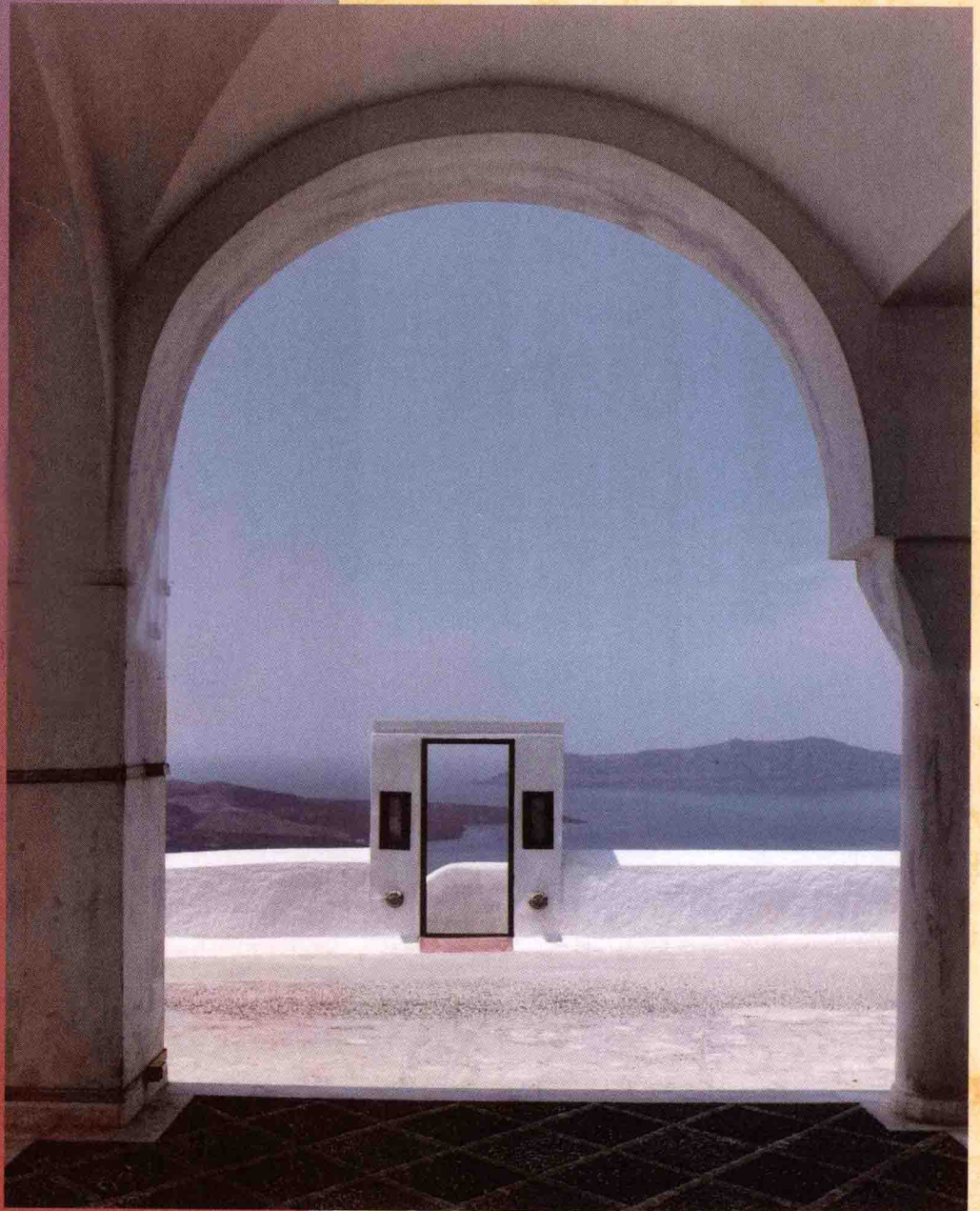


INTRODUCTION TO
Psychology

James W. Kalat

5th Edition

INTRODUCTION TO
Psychology



5
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JAMES W. KALAT

North Carolina State University



Brooks/Cole • Wadsworth

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INTRODUCTION TO
Psychology



To Sam, Robin, Sheila, Julie, Ann, and David

About the Author



Jim Kalat (rhymes with ballot) has been teaching the introductory psychology course at North Carolina State University since 1977. He received a bachelor's degree *summa cum laude* from Duke University in 1968 and a Ph.D. in psychology from the University of Pennsylvania in 1971. Recipient of Duke's Alumni Outstanding Teacher Award and North Carolina State University's Outstanding Teacher Award, Kalat is a Fellow of the American Association for the Advancement of Science, the American Psychological Association, and the American Psychological Society, for which he was the program committee chair in 1991. The author of the bestselling *Biological Psychology* (sixth edition published by Brooks/Cole in 1998), Kalat has also published many articles in psychological journals.

Preface to the Instructor

Teaching psychology means more than just adding to what students know: It should change how they think. It should ensure that something worthwhile remains long after they have forgotten the details.

When students leave my classroom, I certainly want them to know important theories and research. But, more importantly, they should be ready to learn more on their own. They should have the habit of questioning assertions, of asking for evidence and knowing how to evaluate it.

I do not believe that a textbook can instill the habit of questioning assertions merely through boxes labeled “Critical Thinking.” I have tried to model that habit throughout the text by interweaving material that challenges students to examine the evidence (or lack of it) behind some common assertions. This textbook can help students ask their own questions, look for more than pat answers, and, ultimately, learn to appreciate the excitement of psychological inquiry.

WHAT’S NEW IN THE FIFTH EDITION

The first and second editions of this text were published by Wadsworth Publishing Company; the third and fourth by Brooks/Cole Publishing Company; this edition is again published by Wadsworth. The changes in publisher reflect reorganizations by the parent organization, International Thomson Publishing.

The fifth edition includes almost 500 new references, most from 1996 to 1998. Every chapter has been reorganized with new material; retained material has been clarified. Many figures and photographs have been revised or replaced. Major changes include the following:

- * The definitions of all boldfaced terms appear in text; they are italicized for clarity and easy reference.
- * Icons call attention to “Try It Yourself” demonstrations throughout the text that allow students to experience (at least on a small scale) the phenomenon under discussion, and thereby to understand the research better.
- * Each module closes with a section titled “The Message,” which puts the main themes into a broader context.
- * The contents of “Applied Psychology” (the final module in the previous edition) have been integrated into relevant parts of other chapters, especially the introductory chapter and the chapters on cognition, intelligence, and motivation. This reorganization actually increases the emphasis on applied psychology. A module at the end of the book could easily be omitted; including the material in other chapters shows the connections of applied psychology to other topics.
- * “What’s the Evidence?” sections have been added for insomnia (Chapter 5) and object permanence (Chapter 10), and revised for false memories (Chapter 7) and alcoholism (Chapter 16).
- * The emphasis on evaluating evidence and questioning assertions is stronger than ever. For example, in Chapter 7, “Memory,” new examples of how people exaggerate and distort old memories are the Indian rope trick and the rumors of a flying saucer crash near Roswell, New Mexico. Chapter 13, “Personality,” includes new, highly critical scholarship about Freud, and critiques of handwriting analysis and doll play as projective techniques.
- * The order of the last three chapters has been changed. Social psychology has been moved from the 16th to the 14th chapter. Abnormal psychology and therapy, previously the 14th and 15th chapters, are now the 15th and 16th.
- * In previous editions, all the psychological disorders were covered before all the therapies. The problem with this structure is that a certain therapy may be used only for a particular disorder; for example, systematic desensitization for phobia and antidepressant drugs and ECT for depression. In this edition, general principles of abnormalities and therapies are surveyed in Chapter 15, and anxiety disorders, substance abuse disorders, mood disorders, and schizophrenia are discussed in Chapter 16. Therapeutic approaches are included in the discussion of the disorders.
- * Chapter 11, “Motivation,” contains a new module on anger and violent behavior.
- * Chapter 13, “Personality,” contains a new module about major approaches to the study of personality.
- * Chapter 1 includes a new section, “What Are My Prospects If I Major in Psychology?”
- * In Chapter 6, “Learning,” the third module has been changed from “Social Learning” to “Other Kinds of Learning,” and includes social learning, conditioned taste aversions, and birdsong learning.
- * In Chapter 8, “Cognition,” the section on attention has been revised and expanded to include material about

attentive and preattentive processes that was previously in the chapter on sensation and perception.

- * The language module in Chapter 8 is extensively revised, and now covers language development (previously in the developmental chapter), bilingualism, language and the brain, and controversies about language evolution.
- * Chapter 10, “Development,” contains new material on infant cognition and attachment.
- * Chapter 11, “Motivation,” includes new material about obesity and the hormone leptin.
- * Chapter 14, “Social Psychology,” now starts with the module on social perception and cognition, in which the discussion of stereotypes and prejudice is heavily revised. The module on attitudes now includes discussion of rigid, ill-informed attitudes toward the death penalty. The module on attraction is also substantially revised.
- * Chapters 15 and 16, “Abnormal Behavior and Therapies,” include a new section on criticisms of DSM–IV, an expanded and updated discussion of research on therapy effectiveness, new material on the neurodevelopmental and glutamate hypotheses of schizophrenia, and new discussion of the role of expressed emotion.

TEACHING AND LEARNING SUPPLEMENTS

A number of important supplements accompany the text. Greg and Bridget Robinson-Riegler prepared a very thorough and creative Instructor’s Resource Guide (also available electronically) that includes suggestions for class demonstrations and lecture material; it also contains possible answers to the “Something to Think About” questions. The Study Guide, by Ruth and William S. Maki, provides various study aids and practice test items as well as an ESL component by Sally Gearhart. Additional supplements include test items by Leonard W. Hamilton and C. Robin Timmons (also available on disc), videos, an electronic study guide, PsychLab II (interactive software with psychology demonstrations and simulations), and one generic and one book-specific set of transparencies. John Nichols researched and annotated the Web sites.

In addition, you and your students will also have access to the *Kalat Fifth Edition* section of the Psychology Study Center at <http://psychstudy.wadsworth.com/>. This Web site is a convenient place to communicate with students and other instructors, pick up pedagogical tips, lecture ideas, and other instruction aids, and find pertinent Web resources among annotated lists of Internet links, organized by the subject areas covered in the book. Students can use the *Kalat Fifth Edition* site to test and enhance their understanding of the text through chapter-by-chapter interactive tutorial quizzes and practice tests.

ACKNOWLEDGMENTS

A potential author needs self-confidence bordering on arrogance just to begin the job of writing a textbook and, to complete it, the humility to accept criticism of favorite

ideas and carefully written prose. A great many people provided helpful suggestions that made this a far better text than it would have been without them.

In preparing this edition, I was fortunate to work with very skilled and dedicated people. Jim Brace-Thompson, my acquisitions editor until the final stages, provided consistent encouragement, friendship, support, and good advice. Penelope Sky, my developmental editor, was the guiding force behind the illustrations, from identifying what needed to be depicted to selecting photos and revising drawings. Kirk Bomont did an excellent job of supervising the production, a most complicated task with a book such as this. Gary Hespenheide, who managed the art development, and Kelly Shoemaker, who designed the interior and the cover, had the patience and artistic judgment to counterbalance their very nonartistic author. Jan de Prose, the copyeditor, was skillful, efficient, and very pleasant. Faith Stoddard did a marvelous job of coordinating all the supplementary and ancillary materials. May Clark and Cheryl Besenjak accomplished the nearly impossible task of managing all the permissions requests. Lauren Harp planned and executed the marketing strategies. To each of these, my thanks and congratulations.

My sincere thanks also to the staff of Hespenheide Design, the company that produced the book. Gary Hespenheide did a remarkable job of taking a late manuscript and meeting an early publication date. Leslie Shapiro, the photo researcher, found an amazing variety of photographs.

Art Kohn is the source of a number of creative ideas on how to approach certain topics; he is also a stimulating person to talk to and a good friend. My colleagues at North Carolina State University provided me with encouragement, ideas, and free advice. I thank Larry Upton particularly for his extensive and insightful comments.

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James Kalat

Preface to the Student

Welcome to introductory psychology! I hope you will enjoy reading this text as much as I enjoyed writing it. When you finish, I hope you will write your comments on the comments page, cut the page out, and mail it to the publisher, who will pass it along to me. Please include a return address.

The first time I taught introductory psychology, several students complained that the book we were using was interesting to read but impossible to study. What they meant was that they had trouble finding and remembering the main points. I have made this book easy to study in many ways. I have tried to select interesting material and to present it as clearly as possible.

I have also included some special features to help you study. Each chapter begins with an outline and a brief introduction to the main topic and is divided into two or more major sections, or modules. Each module begins with one or more questions—the fundamental questions that psychologists are trying to answer, the questions that motivate research. In some cases you will be able to answer the questions after you read the section; but in some cases psychologists themselves are not sure about the answers. At least you will come to understand the questions better. At the end of each module is a summary of some important points, with page references. If a point is unfamiliar you should reread the appropriate section.

Throughout the text certain words are highlighted in **boldface**. These are important terms whose meaning you should understand. Their definitions are in *italics*. All the boldface terms reappear with their definitions at the end of the chapter and in the Glossary/Subject Index at the end of the book. You might want to find the Glossary/Subject Index right now and familiarize yourself with it. Note that for each term there is both a definition and a page reference. Note also the Theme Index, which directs you to places in the text where general issues are discussed, such as the influences of gender and culture on behavior.

I sometimes meet students who think they have mastered the course because they have memorized all the definitions. They are making a mistake. You do need to understand the defined words, so that you can understand discussions that use them. You should be able to recognize what is an example of the term and what is not. But don't waste time memorizing definitions word for word.

At various points in the text are "Concept Checks," questions that do not ask you simply to repeat what you have read, but to use or apply the information in some way. Try to answer each of these questions, and then turn to the indicated page to check your answer. If your answer is incorrect, you probably have not been reading carefully enough, and you might want to reread the section that the Concept Check refers to.

You will also find an occasional text passage marked "Something to Think About." Here you are required to go beyond what is discussed in the text. In some cases there may be a number of reasonable ways to approach the question. I hope you will think about these questions, perhaps talk about them with fellow students, and maybe ask your instructor what he or she thinks.

Now I'll answer a few of the questions often asked by students.

Do you have any useful suggestions for improving study habits? Whenever students ask me why they did badly on the last test, I ask, "When did you read the assignment?" Some answer, "Well, I didn't exactly read *all* of the assignment," or "I read it the night before the test." To learn the material well, read each assignment *before the lecture*. Within 24 hours after the lecture, review your lecture notes. Then, before you take the test, reread both the textbook assignment and your lecture notes. If you do not have time to reread everything, at least skim the text and reread the material you need to refresh in your memory. As a rule, if you are not satisfied with your test scores you need to spend more time studying, and the best way to study is to spread it out over several days.

Some students, however, spend enough time studying without spending that time effectively. If you read the material but don't remember it, perhaps you are not thinking about what you're reading. As you read this book, try to think actively about what you are learning. One way to improve your studying is to read by the SPAR method: **S**urvey, **P**rocess meaningfully, **A**sk questions, **R**evise.

Survey: Know what to expect so that you can focus on the main points. When you start a chapter, first look over the outline to get a preview of the contents. When you start a new module, turn to the end and read the summary.

Process meaningfully: Read the chapter carefully, stopping to think from time to time. Tell your roommate some of

the interesting things you learn. Think about how you might apply a certain concept to a real-life situation. Pause when you come to the Concept Checks and try to answer them. Good readers read quickly through unimportant or familiar material, but slowly through difficult or unfamiliar material.

Ask questions: When you finish the chapter, try to anticipate what you might be asked later. You can use questions in the Study Guide or compose your own. Write out the questions and think about them, but do not answer them yet.

Review: Pause for a while—at least several hours or, better yet, a day or more. If you first read a chapter before class, come back to it the evening after class. Now write the answers to the questions you prepared earlier. Check your answers against the text or against the answers in the Study Guide. Reinforcing your memory a day or two after you first read the chapter will help you retain the material longer and with deeper understanding. If you study the same material several times at lengthy intervals, you increase your chance of remembering it long after the course is over.

Is it worthwhile to buy and use the Study Guide? The Study Guide is designed to help students who would like help studying, remembering the material, or answering multiple-choice questions. It is most likely to be helpful to freshmen and to students who have had trouble with similar courses in the past. The multiple-choice questions include not only the correct answers but also explanations of why they are correct. You can work through each chapter of the Study Guide in one or two hours. The Study Guide can help if you are willing to spend enough time with it in addition to reading the text.

Does it help to underline or highlight key sentences while reading? Maybe, but don't overdo it. I have seen books in which students underlined or highlighted more than half the sentences. What good that does, I have no idea.

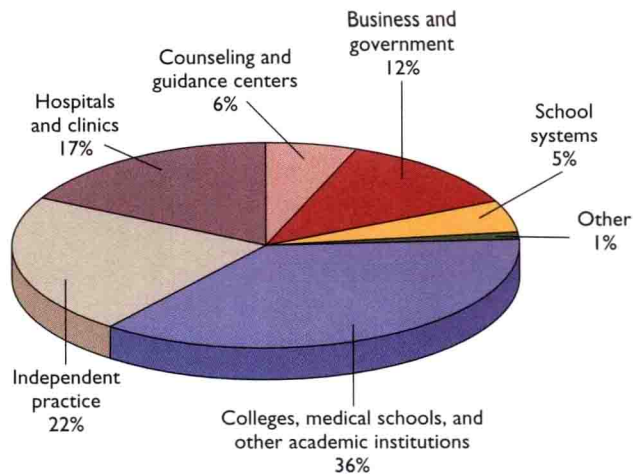


FIGURE 1 Pie graph

What do those parentheses mean, as in “(Maki & Serra, 1992)”? Am I supposed to remember the names and dates? Psychologists generally cite references not in footnotes but in parentheses. “(Maki & Serra, 1992)” refers to an article written by Maki and Serra, published in 1992. All the references cited in the text are listed in alphabetical order (by the author’s last name) in the References section at the back of the book.

You will also notice a few citations that include two dates separated by a slash, such as “(Wundt, 1862/1961).” This means that Wundt’s document was originally published in 1862 and was republished in 1961.

No one expects you to memorize the parenthetical source citations. They are provided so you can look up the source of a statement and check for further information. A few names *are* worth remembering, however. For instance, you will read about the research and theories of such famous psychologists as B. F. Skinner, Jean Piaget, and Sigmund Freud. You should certainly remember those names and a

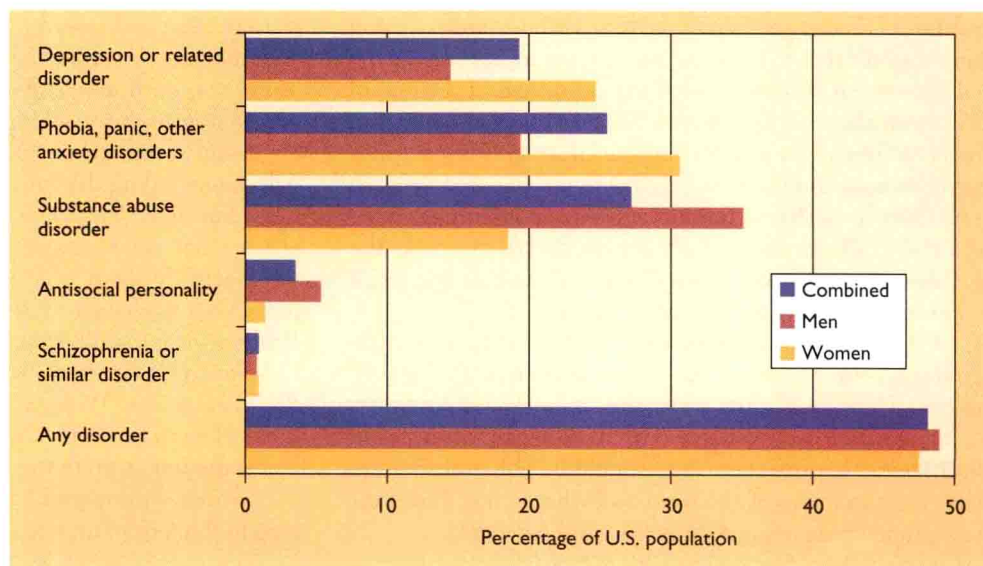


FIGURE 2 Bar graph

few others. But names that are important to remember are emphasized in the discussion, not enclosed in parentheses.

Can you help me read and understand graphs? The graphs in this book are easy to follow. Just take a minute or so to study them carefully. You will encounter four kinds: pie graphs, bar graphs, line graphs, and scatter plots. Let's look at each kind.

Pie graphs show how a whole is divided into parts. Figure 1 shows that more than one-third of all psychologists take a starting job with a college or some other educational institution. Another one-fifth to one-fourth of psychologists work in independent practice. The total circle represents 100% of all psychologists.

Bar graphs show how often events fall into one category or another. Figure 2 shows how many adults in the United States suffer from certain psychological disorders. The length of the bars indicates the frequency of particular disorders.

Line graphs show how one variable is related to another variable. In Figure 3, you see that 80% of people correctly remembered a set of letters—such as HOZDF—after a 3-second delay. As the delay time increased, the percentage of people remembering the letters declined sharply.

Scatter plots are similar to line graphs, with this difference: A line graph shows averages, whereas a scatter plot shows individual data points. By looking at a scatter plot, we can see how much variation occurs among individuals.

To prepare a scatter plot, we make two observations about each individual. In Figure 4, each student is represented by one point. If you take that point and scan down to the *x*-axis, you find that student's SAT score. If you then scan across to the *y*-axis, you find that student's grade average for the freshman year. A scatter plot shows whether two variables are closely or only loosely related.

We may have to take multiple-choice tests on this material. How can I do better on those tests?

1. Read each choice carefully. Do not choose the first answer that looks correct; first make sure that the other

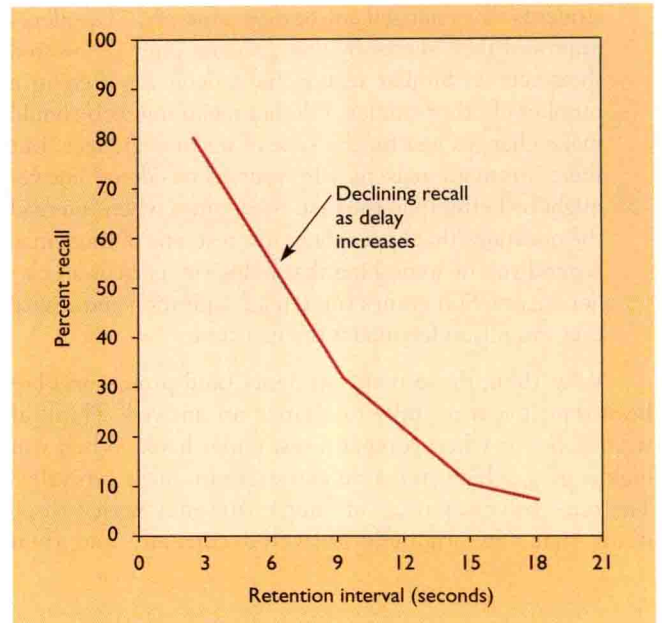


FIGURE 3 Line graph

answers are wrong. If two answers seem reasonable, decide which of the two is better.

2. If you don't know the correct answer, make an educated guess. Start by eliminating any answer that you know cannot be right. An answer that includes absolute words such as *always* or *never* is probably wrong. Also eliminate any answer that includes unfamiliar terms. (Correct choices use only terms that you should know; incorrect choices may include obscure terms or even outright nonsense.)
3. After you finish a test, go back and check your answers and rethink them. You have probably heard the advice, "Don't change your answers; stick with your first impulse." No matter how often you have heard that advice, it is wrong. J. J. Johnston (1975) tested it by looking through the answer sheets of a number of classes that had taken a multiple-choice test. He found that of all the

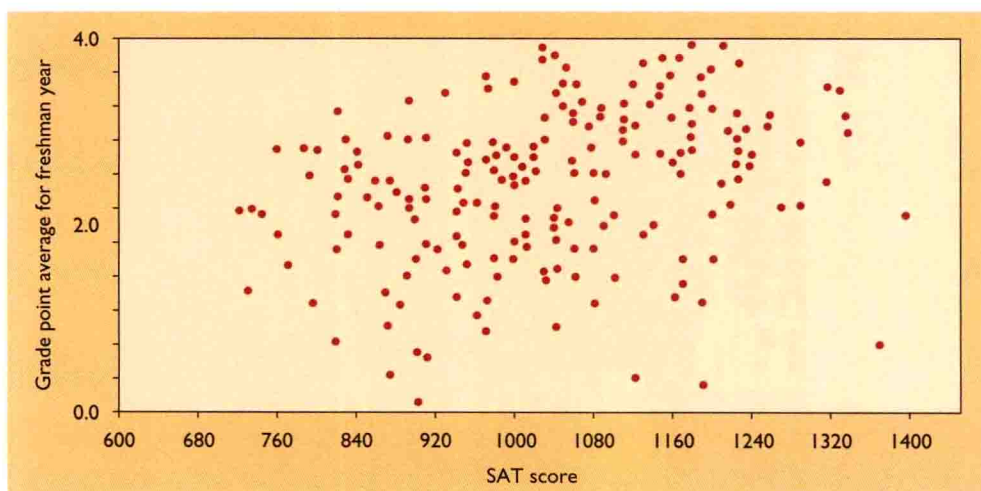


FIGURE 4 Scatter plot

students who changed one or more answers, 71 students improved their scores by doing so and only 31 lowered their scores. Similar results have been reported in a number of other studies. I do not mean that you should make changes just for the sake of making changes. But there are many reasons why your reconsidered answer might be better than the first. Sometimes when you read the questions that appear later in a test, one of them may remind you of something that helps you correct an earlier answer. Sometimes you reread a question and realize that you misunderstood it the first time.

Why, then, do so many students (and professors) believe that it is a mistake to change an answer? Think of what happens when you get a test paper back. When you look it over, which items do you examine most carefully? The ones you got wrong, of course. You may notice three items that you originally answered correctly and then

changed. You never notice the five other items you changed from incorrect to correct.

If you want to practice your multiple-choice skills, you can try your hand at the interactive tutorial quizzes available at the *Kalat Fifth Edition* Web site (<http://psychstudy.wadsworth.com/>). These quizzes go hand-in-hand with the material in this book, with one quiz per chapter. Each quiz is designed to help you find out whether you understand a chapter's main points; if you answer a question incorrectly, you get immediate feedback guiding you to a better understanding of the topic. The *Kalat Fifth Edition* site also includes practice tests, discussion boards where you can exchange ideas with instructors and other students, and Internet links where you can go to learn more about the topics in the book.

James Kalat

A Guide Through the Book

A NOTE FROM THE PUBLISHER

The scientific method is the most powerful tool in the psychologist's and, indeed, the student's intellectual armory. In this book, students learn that questioning assertions, challenging evidence, and evaluating results—all components of the scientific method—are second nature to the study of psychology itself. Jim Kalat introduces students to psychology in a way that will remain with them long after they may have forgotten specific theories, experiments, and results.

The material that follows demonstrates how Kalat encourages students to experience for themselves the excitement of psychological discovery and how he uses the scientific method throughout the book. His carefully integrated learning tools clarify important theories and research.

Kalat's remarkable skill in getting students involved in using the scientific method to question assertions is what

distinguishes *Introduction to Psychology, Fifth Edition*. Most books present the research and facts and expect students to memorize what's been discovered. Kalat encourages students to open the doors to further exploration: He helps them become more intelligent consumers of psychological research.

A BOOK STUDENTS TRULY LOVE

Throughout the text, Jim Kalat does more than tell students what they ought to know—he engages their desire to learn. He speaks directly to his readers, drawing them into psychological concepts and information in a way that actually changes the way they look at assertions and facts. Kalat's engaging writing style includes humor and personal anecdotes, and helps make the Fifth Edition an exceptional learning tool that your students will truly enjoy using.

AN INTRODUCTION TO THE POWER OF QUESTIONING ASSERTIONS

Chapter 2 is the most important chapter in the book. It not only deals with the procedures for conducting research but also provides a conceptual guide to how psychologists evaluate evidence and theories and, in general, to how they think. For example, Kalat highlights the importance of replicability, the criterion of falsifiability, and the principle of parsimony.

Early in Chapter 2, Kalat presents an overview of the research process. He introduces the *four steps* in gathering and evaluating evidence—**1 Hypothesis**, **2 Method**, **3 Results**, and **4 Interpretation**. This critical material—the heart of the scientific method—is then reinforced throughout the text.

30 Chapter 2 Scientific Methods in Psychology

watch one set of programs and another group to watch a different set of programs, and then record behavioral differences between the groups.

3 Results Fundamental to any research is good measurement, and a phenomenon such as “violent behavior” can be especially tricky to measure. (How do we decide what is real violence and what is just playfulness? Do threats count? Verbal abuse?) It is important for an investigator to adopt clear rules for making measurements and then use these rules consistently. Depending on the nature of the study, the investigator calculates appropriate statistics for expressing the results and evaluating whether these probably indicate a meaningful trend or just a random fluctuation.

4 Interpretation The final task is to determine the significance of the results. If the results clearly contradict the hypothesis, researchers should either abandon or modify the original hypothesis. (Maybe it applies only to certain kinds of people or only under certain circumstances.) If the results *match* the prediction, investigators may gain confidence in their hypothesis but they should not necessarily accept it. Even though the results fit the hypothesis, they might also fit other hypotheses or explanations as well. Because almost any study has limitations, the ultimate conclusion can come only from a pattern of results derived from many studies.

Replicability

Years ago, investigators trained rats to respond in a certain way, then ground up the rats’ brains, injected an extract of the trained rats’ brains into other rats, and reported that the new rats remembered what the old rats had learned (Babich, Jacobson, Bubash, & Jacobson, 1965). Many other experimenters tried to replicate this surprising result. A few reported results somewhat similar to those of the first experimenters, but most investigators could not (Gatto, 1976; L. T. Smith, 1975). That is, these results were not replicable. **Replicable results are those that anyone can obtain, at least approximately, by following the same procedures.**

What should we do when results are not replicable? First, we determine whether the different investigators really used the same procedures. Sometimes, what appears to be a minor change in procedure yields a major difference in results. Did the researchers use different kinds of rats, or different methods of training, or different ways of extracting brain chemicals? In the research on transfer of training by brain extracts, psychologists found no consistent relationship between the results and any aspect of the procedure. In fact, most laboratories found no evidence that the brain extracts had any influence on other rats under any conditions. So, then what? The rule is that, if researchers cannot find conditions under which they dependably get a particular result, then they do not accept that result. This rule may

seem unduly harsh. If scientists can claim to have

Sometimes, for example, many studies of behavior in men are substantiated by a slightly different or a different variation, we view this behavior to be that the sex difference influences the results of a measure of the behavior. **bin the results though they were all one very large study.** For example, one meta-analysis found that men are indeed more likely than women to engage in unprovoked violence (Bettencourt & Miller, 1996). In most cases, a meta-analysis will also determine which variations in procedure are associated with the largest effects.

Criteria for Evaluating Scientific Theories

Up to now, I have alluded to research in psychology without using much detail. We shall consider the details of research methods later. Here, let’s look at the big picture: After investigators collect mounds of evidence, what do they do with it?

One goal of scientific research is to establish **theories, comprehensive explanations of observable events.** A good theory predicts many observations in terms of a few assumptions and thus reduces the amount of information we must keep available for reference. For example, according to the *law of effect* (to be discussed in Chapter 6), if a human or any other animal makes a response that is consistently followed by a reinforcer (such as food to a hungry person or water to a thirsty one), then the future probability of that response will increase. This law summarizes results achieved for many species, many responses, and many reinforcers.

When we are confronted with several competing theories, we must evaluate them to decide which is the most acceptable (Figure 2.2). To illustrate, let’s consider some unsatisfactory theories. First, consider what is wrong with this theory: “Karl is stingy; so he must have had a fixation in the anal period of psychosocial development.” The theory fits the data (Karl is stingy), but we already knew those data before the theorist said anything. No one had any other reason to believe that Karl had an anal fixation, except that he became stingy. So the theory does not really make any predictions. One important criterion for any theory is that it *should predict new observations.* If it accurately predicts ob-

MODULE 2.1

Science and the Evaluation of Evidence

How do scientists evaluate theories?
Why are most scientists so skeptical of new theories and claims that seem to contradict our current understanding?

You will sometimes hear nonscientists say that something has been “scientifically proved.” Scientists themselves seldom use the word *proved*, except when they are talking about a mathematical proof. As scientists collect more and better evidence, they may become confident about a given conclusion, but the word *prove* sounds a little too final.

One distinguishing characteristic of science is that scientists generally agree on how to evaluate competing theories. Even when they disagree about which theory is best, they can usually agree on what kinds of evidence they will accept. Most psychologists are quick to concede that our knowledge of psychology is less complete and less systematic than our knowledge of physics, chemistry, and biology. But like physicists, chemists, and biologists, psychologists do generally agree on what constitutes good evidence and what does not. They try to rely on the best available evidence and draw no conclusion at all if the evidence is weak.

SOMETHING TO THINK ABOUT

If people interested in ethics agreed with one another about how to evaluate theories, could they make progress comparable to that of scientists? Could theologians? *

Steps for Gathering and Evaluating Evidence

Above all, scientists want to know the evidence behind a given claim. In psychology, as in other fields, students should learn to question assertions, to ask for the evidence behind a given claim.

The word *science* derives from a Latin word meaning *knowledge*, and there are many routes to scientific knowledge. The simplest is just careful observation, and much of science consists of recording observations. We also gain scientific knowledge by testing **hypotheses**, which are *testable predictions of what will happen under certain conditions.* Research designed to test hypotheses goes through the series of steps described in the following four paragraphs (see also Figure 2.1). Articles in scientific publications generally follow this sequence, too. In each of the following chapters of this book, you will find an example of a psychological study, described in a section entitled “What’s the Evidence?”

1 Hypothesis A hypothesis can be based on a larger theory. For example, “if our understanding of social influence is correct, then children who watch a great deal of violence will themselves become more violent.” In other cases, the hypothesis is the product of preliminary observations. For example, a psychologist might notice that several children who have outbursts of violent behavior have a habit of watching violent television programs and therefore suggest the hypothesis that watching violent programs leads to violent behavior.

2 Method Researchers have many methods for testing hypotheses. To test the effects of violent television shows, one possibility would be to measure how much time various children watch violence on television and relate that amount of time to a measure of their violent behavior. However, even if the correlation appeared strong, the results would not demonstrate cause and effect. (Maybe watching violence provokes violence, but it is also possible that children who are predisposed to violence like to watch it on TV.) Another approach would be to ask one group of children to

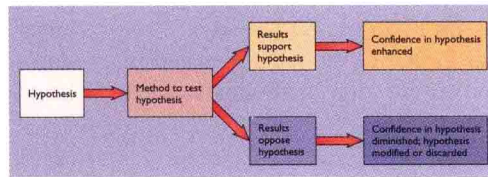


FIGURE 2.1 A hypothesis leads to prediction. An experimental method tests those predictions; a confirmation of a prediction supports the hypothesis; a disconfirmation indicates a need to revise or discard the hypothesis. Conclusions remain tentative, especially after only one experiment. Most scientists avoid saying that their results “prove” a conclusion.

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WHAT'S THE EVIDENCE?

Appearing in each chapter from Chapter 2 on, each *What's the Evidence?* section presents an interesting problem and then examines one or more experiments in some detail. The format reinforces the steps of the scientific method, until it becomes part of the way students think.

These sections illustrate how scientific research is set into motion by posing a question. Then, using the scientific method of Hypothesis–Method–Results–Interpretation, Kalat walks students through one or two studies that explore the question. Where appropriate, he points out limitations in the research, ethical considerations in the methods, and alternative interpretations of the results so that students have a model of how psychologists evaluate evidence.

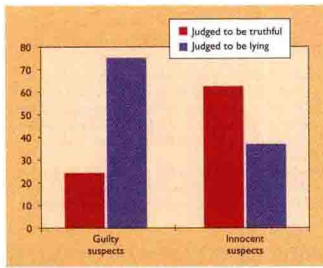


FIGURE 12.8 Polygraph examiners correctly identified 76% of guilty suspects as lying. However, they also identified 37% of innocent suspects as lying. (Based on data of Kleinmuntz & Szucko, 1984.)

free than to convict innocent people, these polygraph results are disturbing.

The results of this study are typical of similar research; in fact, this study may have even underestimated the tendency of polygraph administrators to call innocent people liars. In some studies, polygraph administrators have called half or more of the innocent people liars (Forman & McCauley, 1986; Horvath, 1977; Patrick & Iacono, 1989).

Imagine the consequences: Suppose we give polygraph tests to ten suspects, one of whom is guilty. The test would have about a 76% chance of identifying the guilty person as lying, but it would also identify several of the innocent people as liars. Or imagine giving a polygraph to all the people who work for a company, asking whether they have ever stolen from the company. Even if every employee is loyal and innocent, the test may identify almost half of them as liars. Because of the low accuracy of polygraph tests, the U.S. Congress passed a law in 1988 prohibiting private employers from giving polygraph tests to employees or job applicants, except under special circumstances (Camara, 1988). Polygraph results are only rarely admissible as evidence in a court of law.

An Alternative: The Guilty-Knowledge Test

The **guilty-knowledge test**, a modified version of the polygraph test, produces more accurate results by asking questions that should be threatening only to someone who knows the facts of a crime that have not been publicized (Lykken, 1979). Instead of asking, "Did you rob the gas station?" the interrogator asks, "Was the gas station robbed at

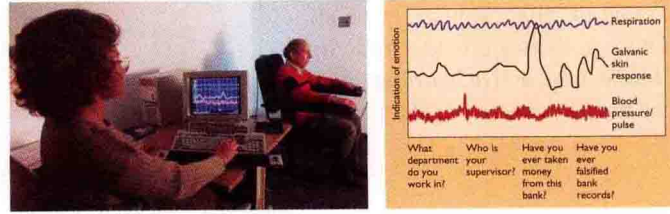


FIGURE 12.7 The polygraph, a method for detecting nervous arousal, is the basis for the so-called lie detector test. The polygraph operator asks a series of nontreating questions to establish baseline readings of the subject's autonomic responses, then asks questions relevant to an investigation. The underlying assumption is that an increase in arousal indicates nervousness, which in turn indicates lying. Unfortunately, a large percentage of innocent people also become nervous and therefore appear to be lying.

WHAT'S THE EVIDENCE? The Effectiveness of a Polygraph in Detecting Lies

Hypothesis Polygraph administrators will identify guilty suspects as liars more often than they identify innocent suspects as liars.

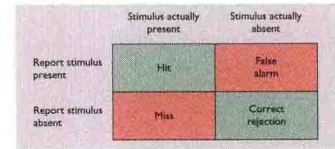
Method To test this hypothesis, the investigators need a sample of people who are known to be guilty and another sample who are known to be innocent but who are otherwise similar to the guilty people. In one study, the investigators selected 50 criminal cases where two suspects had taken a polygraph test, and one suspect had later confessed to the crime (Kleinmuntz & Szucko, 1984). Thus, the investigators knew which 50 suspects were guilty, and they knew that the 50 innocent people were similar enough to have been plausible suspects. It is important to note that all suspects had denied their guilt at the time of the polygraph test.

During the administration of the polygraph, suspects were asked two kinds of questions: *Relevant* questions pertained to the crime itself; for example, "Did you steal \$125 from the convenience store last Tuesday?" *Control* questions took the following form: "Have you ever taken anything of value that was not yours?" Theoretically, someone who robbed the convenience store should be more nervous about the first question; anyone else should be, if anything, more nervous about the second.

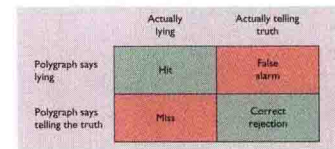
Six professional polygraph administrators examined all the polygraph results and judged which suspects were lying and which were telling the truth.

Results Figure 12.8 shows the results. The polygraph administrators did manage to identify 76% of the guilty suspects as liars; however, they also classified 37% of the innocent suspects as liars.

Interpretation Recall from the discussion of signal detection in Chapter 4 that, when a person is trying to determine whether something is present or absent, there are two possible correct decisions (green in the following diagram) and two possible errors (red).



Polygraph administrators can also make two kinds of correct decisions and two kinds of errors:



A polygraph user obtains more "hits" than most people do on their own. However, most of the errors made by polygraph users are "false alarms" (also known as "false positives")—falsely identifying innocent people as lying. Given the usual belief that we would prefer to let guilty people go

8:00 P.M.? at 10: Did the robber call the "knowledge"—crime possess. The guilted, identifies a rarely makes the as guilty (Balloun, Elaad, 1990).

SOMETHING TO THINK ABOUT
How might the results be biased by a question about the crime? How should the test be administered to minimize that bias? *

Pencil-and-Paper Integrity Tests

Suppose you are an employer who wants to know whether someone applying for a job at your company is likely to be an honest worker. Giving a polygraph test is illegal and would not be very accurate anyway, and you can't give a guilty-knowledge test, because no one can have guilty knowledge about a crime that has not yet occurred. So what do you do?

One approach is to administer pencil-and-paper "integrity tests" that ask such questions as these:

- Have you ever stolen money or property from a previous employer?
- Do you think that most employees occasionally steal from their employers?
- On previous jobs, have you ever left work early while claiming to work a full day?
- Have you sometimes come to work while under the influence of illegal drugs?
- If you were sure you wouldn't get caught, would you ever make personal long-distance phone calls and charge them to your employer?

You might imagine that anyone who has a history of dishonest dealings with previous employers would lie about it. Amazingly, many people fill out the questionnaire honestly, admitting a long history of past dishonesty. (Perhaps they assume the new employer will find out about this history anyway by checking with previous employers.) Research on such tests is limited, but it suggests that these tests manage to identify a good percentage of dishonest people (Camara & Schneider, 1994).

However, the integrity tests have two major problems: First, they misidentify some extremely ethical and scrupulous people who "confess" to being imperfect (Lilienfeld, Alliger, & Mitchell, 1995). For example, someone may read the question, "Have you ever stolen property from a previous employer?" and think, "Well, there was that one time