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We all encourage our students to use critical thinking, but often it is done as an abstract exercise that, ironically, succeeds merely in uncritically listing the steps one needs to follow to become a critical thinker. Such is the approach used in many books about experimental design. The editors of this text, however, have chosen a different concept. They asked researchers whose work exemplifies critical thinking to describe the processes they engage to formulate research questions and develop designs for isolating the mechanisms responsible for the psychological phenomena they are studying.

A striking aspect of this approach is how the critical thinking of the past has led to innovative breakthroughs in the design of experiments. Those innovations, described in many chapters of this book, have become the now obvious, accepted practice of today.

The opening chapter, by Halpern, defines critical thinking by identifying various skills, acquired through training, that can be brought to bear on a problem. Several of the next chapters deal with the advantages and disadvantages of various experimental designs in minimizing the likelihood of allowing confounding variables to affect results while maximizing the likelihood of finding an effect. In Roediger and McCabe’s chapter on the evolution of false memory research, the authors identify the pros and cons of various within-groups and between-subjects manipulations. The chapter by McDermott and Miller expands on this theme by describing the appropriate use of experimental and correlation studies. Sternberg and Grigorenko present 21 practical lessons to guide the design and analysis of research.
Their strength is in the provision of specific advice and concrete examples; they make the lessons easily understood.

Shadish's chapter on quasi-experimentation notes the particular importance of critical thinking when one is faced with designs that for ethical or practical reasons do not allow for random assignment of subjects to treatments. And Schwarz's chapter on surveys and questionnaires notes how difficult it is to objectively design such research and interpret its results. Schwarz describes several threats to the validity of a study that can affect results by introducing subtle but often important biases. Although true of many of the other chapters in the book, this one in particular makes it clear that there is no single formula for designing excellent experiments. Instead one must think creatively about the kinds of problems one may encounter in interpreting the results.

The chapter by Martin and Hull clarifies when a case study approach is warranted. Although one tends to think of case studies as largely anecdotal and useful primarily in individual diagnosis, when they are used in neuropsychological studies, they can be very useful for identifying independent processes. For example, with a broad battery of tests one may be able to identify deficits that are quite specific in an otherwise normally functioning person. On the basis of a small number of case studies, there is convincing evidence that deficits in working memory can occur with little accompanying loss of either long-term (reference) memory or procedural (action) memory.

The chapter by Dennis and Kintsch focuses on the evaluation of a theory. Is it consistent? Is it coherent? Is it falsifiable? Can it account for a broad range of data? Is it reasonable? Chapters by Jordan and Zanna and by Spellman, DeLoache, and Bjork focus on the persuasive presentation of results. A classic mistake of researchers, especially those who are new to the enterprise, is to present only the facts and let the reader reason how those data support (or fail to support) the theory being tested and their implications. Instead, Jordan and Zanna describe the presentation of a persuasive argument that neither understates nor overstates the implications of the results. Spellman, DeLoache, and Bjork continue with this important theme by describing how to appropriately make a claim for one's results.

Many of the later chapters in the book deal with biases on the part of the experimenter (or the reader) that may affect the credibility of research. Risen and Gilovich note that experimenters are only human and thus have biases that may prevent them from being objective about their results. For example, there is a natural tendency to look for evidence that supports one's hypothesis (the confirmation bias) rather than evidence that is inconsistent with it. One may also tend to interpret ambiguous results in terms that can be easily integrated into what one believes to be true (the assimilation bias). Although these biases often serve one well in everyday life by allowing for rapid decisions based on rules of thumb or heuristics, in evaluating research they can often lead to faulty conclusions. Hyman's chapter notes that such biases are particularly evident in interpreting the results of research on parapsychology, because most researchers who conduct this kind of research have a strong belief in the existence of paranormal processes. The reasons for such beliefs are complex. Pratkanis explains that experimenters and readers alike are affected by variables known to be involved in social influence. Schneider's chapter goes one step further in proposing that humans are
predisposed to hold beliefs that are often based on emotions rather than logic, on few personal experiences, or on teachings of our culture. A technique to avoid these biases involves putting oneself in the role of a nonbeliever (i.e., by playing “devil's advocate”).

Finally, Fisher, Fried, and Masty show how critical thinking may be applied to the difficult problem of choosing among several imperfect solutions, each of which may raise its own ethical problems. An example they give is the conflict between the best interests of the client and those of society. If a client discloses a threat to do harm to others, how does one weigh client confidentiality and the possibility of legal consequences for the client against the obligation to warn others of the potential danger? The authors propose that sometimes, the development of novel approaches to reduction of the threat may allow one to avoid the dilemma (e.g., convincing the client that harming others is not an appropriate response or finding a way to warn others without implicating the client).

The chapters in this book provide strategies for the development of critical thinking. They focus on approaches for avoiding the many possible pitfalls one may encounter in conducting research and evaluating findings. They correctly view critical thinking as an art that builds on the critical thinking of those who came before, and they challenge the reader to be an active participant in the creative process.

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