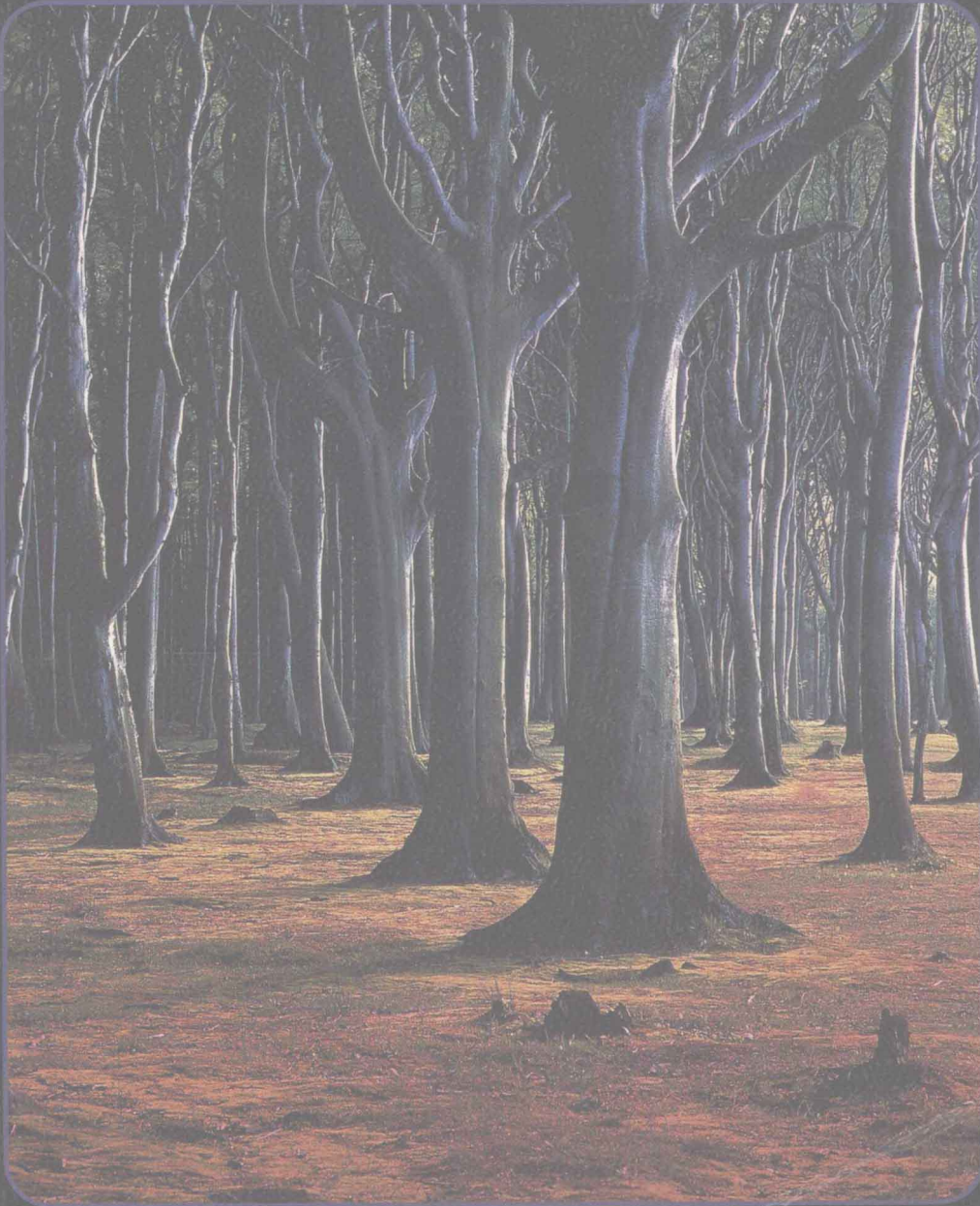


THINKING CRITICALLY

TECHNIQUES FOR LOGICAL REASONING



James H. Kiersky • Nicholas J. Caste

THINKING CRITICALLY

Techniques for Logical Reasoning

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CIP

Thinking Critically. . . is first and foremost a textbook on critical thinking and informal logic. As such, it encompasses many of the traditional topics that have been associated with these fields since the time of Aristotle, two and a half millenia ago: good and bad thinking, fallacies, definitions, meaning, induction, deduction, syllogisms, enthymemes, sorities, and a host of others. It also covers more recent additions to the field—conditionals, counterfactuals, predicate logic, truth tables, standardized testing, logical writing and organization, to name a few. Rather than simply learn a number of apparently disconnected skills or memorize interesting but out-of-date technical terminology, we have approached the topics of critical thinking and informal logic as if they were themselves *processes* for helping all of us better our lives as well as those of others. Admittedly, this is a fairly tall order.

But if there are good grounds for seeing critical thinking and logical reasoning as *processes* that are (or can be) a part of everyday life, then several beneficial results may occur. First, it becomes a fairly simple task to get an overview of the entire subject matter, which in turn will help us keep in mind where we are and why we are there. Second, by considering reasoning from the perspective of a process, we can then devise a set of strategies and techniques for approaching and resolving problems as they arise. Third, by studying logic and critical thinking from the practical standpoint, it is more likely that the skills learned will be put to use outside of academics, possibly retained beyond the end of a quarter or semester, and even incorporated into one's working set of behavioral dispositions. If this is correct, the notion of critical thinking as a *skills* course begins to take on deeper significance. Those skills are not simply means to an end (i.e., passing another course), nor are they ends in themselves (i.e., exercises that may be intrinsically enjoyable, but which have no apparent applicability). Instead, if they can be both instrumental in helping us improve the quality of our lives and the lives around us, they should also enrich those lives.

No doubt, this is a bold claim. To what extent we can actually make logic and critical thinking work for us will depend as much on those using the book, students, professors, readers, as on those of us who formulated it in the first place. This is not meant to abrogate any responsibility; we hope we have done our part for the text itself. But we also realize there may be no such thing as the perfect text especially in these areas. Indeed, we would like to reduce the number of flaws in the event of a second edition. With that in mind, we would appreciate any and all comments on the text—good, bad, critical, helpful. Please write and let us know. Whatever suggestions we incorporate into the next edition will be so acknowledged.

Organization of the Text The text has been organized around a central idea—that of “The Critical Technique,” one possible way of many for analyzing, evaluating, formulating, and/or writing arguments and lines of reasoning. To that end it has been divided into three distinct parts. Part One focuses on recognizing arguments, analyzing them, breaking them down into their component parts, clarifying the content and meaning where necessary, and then portraying with accuracy the structure of that reasoning. Certain measurable skills should result from a study of this portion of the text: enhanced ability to recognize premises and conclusions, to spot indicator words, to distinguish inductive from deductive reasoning, to identify presuppositions (unstated premises) and implications (including unstated conclusions), plus the ability to assess definitions, clarify meaning, recognize vagueness and ambiguity, among other skills.

Part Two continues the development of the Critical Technique by shifting from the analysis of arguments and disagreements to the assessment or evaluation of those lines of reasoning. There are three distinguishable phases here, although one of them is clearly a blend of the other two. We begin with that phase: recognizing fallacies, mistakes in the reasoning process. Then we move to a second important phase, that of critically evaluating lines of reasoning solely on the basis of their structure or form. Finally, arguments may be critiqued on the basis of their content: how true, relevant, fair, or adequate the evidence is in support of the conclusion. Again, certain very measurable skills should result: for example, the ability to distinguish between validity, truth, and soundness; the ability to distinguish valid argument forms from

invalid ones, the ability to draw immediate inferences and to determine what necessarily follows from a line of thinking. A study of fallacious modes of reasoning should also result in enhanced capabilities for determining what evidence is relevant, pertinent, fair, and adequate or sufficient for drawing what conclusions.

Part Three forms the conclusion of the text by showing some of the applications of the Technique, particularly in the fields of non-deductive reasoning, in scientific thinking, causal argumentation, analogical reasoning, explanations, theories, hypotheses, and several parallel forms of reasoning. It also focuses in upon the relevance of many of these critical strategies for standardized test taking. And, it concludes with a discussion of ways in which these strategies may help improve argumentative writing skills. Some of the measurable skills that may be expected to result from this portion of the text should be fairly evident from this description alone: improved writing and organizational skills, enriched test-taking skills, better understanding of scientific reasoning, analogical thinking, theories, hypotheses, explanations, causal reasoning, parallel reasoning, moral argumentation, to name a few.

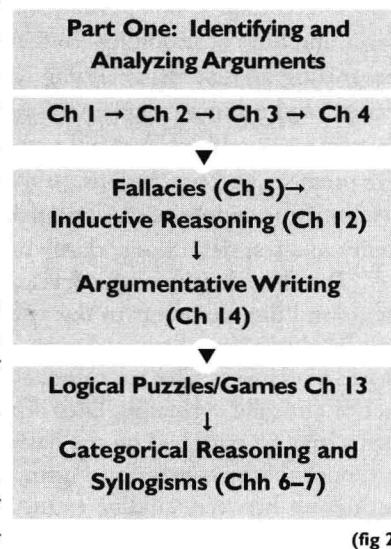
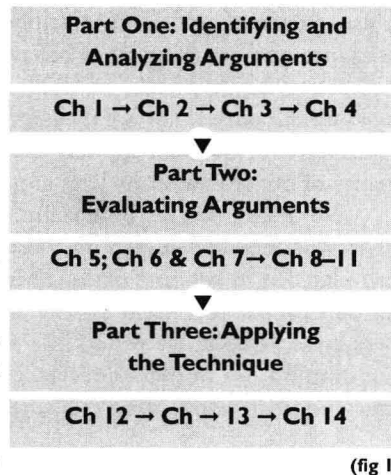
Different Possible Uses/Applications

If a textbook in the fields of critical thinking and logical reasoning, is to be worth its salt, it will have to be *quite* adaptable. These are arenas covering such a broad spectrum of human cognitive life that almost everyone teaching or using a text of this nature will have their own agenda for doing so. Indeed, even the two authors use the text quite differently. We can only begin to show some of the possible options for using the text to maximum advantage by giving you four quick examples.

(1) The Linear Approach. (fig. 1) The text is organized in such a way that it can actually be followed from start to finish by studying Part One first, then proceeding to Parts Two and Three. Much of the material will turn out to be cumulative in the sense of a building of basic skills that are sharpened and integrated as the text proceeds.

(2) The Critical Thinking Approach. (fig. 2) For those more interested in developing critical thinking skills, the text can be followed by studying Chapters One through Four first, then continuing with a study of Chapter Five on Fallacies, then moving to Chapters Twelve and Fourteen. Once these portions of the text have been mastered, then attention can be turned to Chapter Thirteen on standardized test questions and Chapters Six and Seven to cover categorical reasoning, syllogisms, and the rudiments of deductive argument forms.

(3) The More Traditional Approach. (fig. 3) For those who find it more practical or desirable, the study of logical forms may be accomplished first, by beginning with a quick reading of Chapter One and the second half of Chapter Two (Sections 2-2 and 2-3). Chapters Eight through Eleven on Truth Functional Connections and Propositional Logic should be studied next, followed by a return to Chapters Six and Seven on the older categorical forms of reasoning. Once this has been accomplished, the first half of



Chapter Two and Chapters Twelve and Thirteen would round this form of studying logical reasoning processes.

(4) The Standardized Test Approach. (fig. 4) In order to use the text as an aid for preparing to take a standardized test such as the LSAT, the GRE, the GMAT, or even the MCAT, one of the main considerations is how much time remains until the test date. If you have planned ahead and left yourself five to six months before the test, then you have ample time to read through using Linear Method 1 just described, and you will better understand a lot of the theory behind the test. If you are more like the majority of us and have only limited time at your disposal, you can do the following:

(a) Read and work Chapter Thirteen so that you have a working knowledge of at least some of the kinds of logical puzzles and games likely to come up on the analytical and logical reasoning sections of the text.

(b) Go back and scan Sections 2–2 and 2–3 to understand the nature of arguments and inductive versus deductive reasoning enough to read 3–1 carefully. Then, work the B-Level problems at the end of section 3–1. Once you have mastered the kinds of assumption—implication problems likely to arise, then,

(c) Go to Section 14–2 and read and work the B-Level exercises on parallel reasoning.

(d) Now, go to Chapters Six and Seven and study the *diagramming* techniques for dealing with syllogisms and categorical logic. See how well you do on the exercises in those chapters and, once you are getting 75–80% or better on all of these sections, and are feeling reasonably comfortable about these problems, then

(e) Skim through Chapter Five in order to be able to pick out fallacious forms of reasoning. If any time remains and if the test you are taking contains a writing sample,

(f) Read and work the remaining exercises in Chapter Fourteen in order to be able to anticipate the writing sample portion of these tests.

Exercises

As in perhaps any critical thinking and logical reasoning book, the exercises in the text are one of the most crucial ingredients for understanding, applying, and mastering the skills and techniques. We have placed them at the *end of each section of every chapter* so that there would be no long gaps in between testing out what you have been covering. If there is a problem, you will not have to wait to find out what it is. Second, we have tried to keep the exercises as relevant as possible without becoming too tedious or overwhelming. We also attempted to increase the difficulty level gradually. And, most importantly, we have organized the exercises on *three distinct levels*: The *A-Level exercises* are there as a kind of barometer to let you and your instructor know how well you have read and understood the material in that

Logic & Critical Thinking (Ch 1)



Inductive/Deductive
Arguments Ch 2–2 & 2–3



Propositional Logic, Truth-
Functional Connectives
Chh 8, 9, 10, 11



Categorical Logic; Syllogism
Immediate Inference,
Enthymemes, Sorites
Chh 6 and 7



Reasons & Causes, Analogies,
Hypotheses, Theories,
Explanations (Ch 12)
Logical Puzzles/Games
Ch 13

(fig 3)

Logical Puzzles/Games Ch 13



Ch 2-2 and 2-3, Inductive and
Deductive Reasoning
Then: Ch 3-1 Spotting Assump-
tions and Implications



Ch 14-2: Parallel Reasoning
Exercises in B-Level Ex.



Chh 6 and 7, esp. diagramming
techniques. Work exercises



Ch 5- Fallacies and Mistakes in
Reasoning, esp. Personal Attack,
Begging the Question and
Assuming the Cause



Ch 14- Writing Sample
Exercises in Chapter

(fig 4)

section. There are immediate tests for feedback. *The B-Level exercises* test your ability to *apply* to a range of problems the distinctions that have been made during that section. *The C-Level exercises* are in a way self-referential tests of how functional those distinctions may be in actuality. They may contain questions at a much deeper level of difficulty. They may contain questions about the limits of applying the distinctions made during that portion of the chapter. Or, they may contain questions relating different portions of the text to material currently being studied. Selected solutions to these exercises appear in an appendix to the text.

Integration with Writing

More and more, a connection, hitherto unseen, between critical thinking and logical reasoning on the one hand and argumentative writing on the other is being recognized and fostered on college campuses. This text is designed with that factor in mind. Over fifty percent of the logic and critical thinking courses we teach have a writing component as one of the major, stated objectives. The exercises at the end of each section as well as the entirety of Chapter Fourteen contain ongoing ideas for improving writing skills at each level of the Technique until they are all reintegrated and reinforced at the conclusion of the text. Indeed, if we were teaching a writing course that contained critical thinking skills as a component, this text could also be utilized quite practically by beginning with Chapter Fourteen. You will notice that virtually every component in that chapter is explained in much greater detail, point by point, earlier in the text.

Whether used in a writing course or a critical thinking course, or even a logic course, the writing component can be integrated to whatever extent is deemed appropriate.

Special Features

We have tried to incorporate a number of features that worked particularly well in our own classes and to eliminate others when student feedback took a negative turn. Generically, some of the major features we retained include

- "A Critical Technique", a masterplan, an overview of the subject matter to be covered with a chapter by chapter roadmap of where we are.
- At the beginning of each chapter, a list of the important terms and concepts occurring in that chapter, a sort of "mini-index and glossary".
- "Reality Checks", which could consist of anything from a comic strip, to a letter to the editor, to a "sound-bite" from a television show, and which functions as an example (or sometimes a counter-example) of the material under discussion. Usually, the "reality checks" are there for the purpose of illustration when they might be disruptive of the flow of the text, if incorporated directly into it.
- Exercises at three distinct levels of difficulty as discussed above and placed at the end of each section of each chapter.
- A concise chapter or sectional summary to highlight the important points discussed in that portion of the text.
- A Case Study at the end of each chapter to exemplify something of importance about that chapter: for example, a way in which the *Technique* may be utilized at this level, or a case in which newly acquired skills may be practiced on a larger scale, or an alternative to the approach we covered in the chapter.
- A Glossary of Terms (and Symbols) at the end of the text.
- A particular slant to some of the exercises in each chapter to show how questions of the sort are used on standardized tests (particularly ones like the LSAT, the GRE, the GMAT, and others); plus an entire Chapter devoted to the logic of puzzles and games and standardized test questions.
- Examples from as many areas of life as we could think of, from business to medicine, law to engineering, computers to art, morals to baseball, culinary skills to world politics.

- Suggested aids for improved writing skills beginning with becoming more culturally sensitive and moving toward greater organizational skills.

Acknowledgments

Unlike many first editions, the text of this particular book has undergone many revisions which are the direct result of excellent student feedback. Add to that the diligence and care that our editors here at West Publishing Company, especially Joan Gill and Becky Stovall, have bestowed upon the text as well as the reviewers they have chosen for their professional expertise, and we find very few persons other than ourselves upon whom we could place the blame for what errors remain in the text itself. There is no way that we could name all the people to whom we owe a considerable debt. There are many who should be named, and for those we may have omitted, we are truly sorry. That being said, we make no pretense of having created a novel work. There are many whose works we have used when we were undergraduate and graduate students, then later when we were young instructors. The debt to such writers and logicians as Salmon, Copi, Fearnside, Carney, Sheer, Toulmin, Scriven, Jeffries, Pospesh, and many, many others is incalculable. Likewise, much is owed to our colleagues, particularly, Milton Snoeyenbos, Don Nilson, and in our younger days, Nick Fotion. Family and friends not only provided a great deal of support both “moral” and as informal editors and source material.

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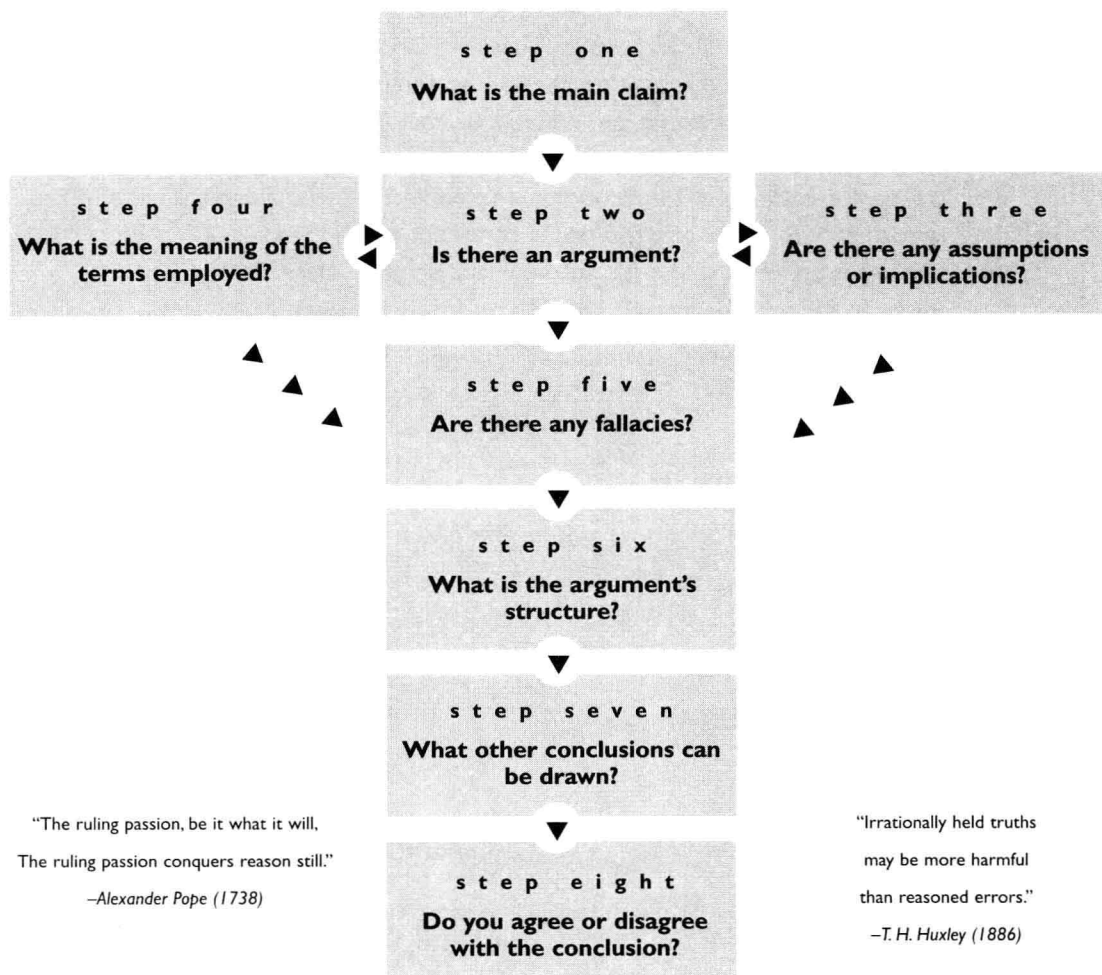
1

THE ANALYSIS OF ARGUMENTS

Two main parts of the critical technique include (1) analysing arguments and (2) evaluating arguments. The initial analytical phase primarily involves breaking down arguments into their component statements (claims), identifying premises and conclusions, distinguishing deductive from inductive reasoning, spotting assumptions and implications, portraying the structure of the reasoning involved, and clarifying meaning as necessary. This part of phase one is covered in the first four chapters and is preliminary to a fair, adequate, and accurate assessment of the argument, which is a major goal for the critical technique itself.

1

A TECHNIQUE FOR THINKING CRITICALLY





CHAPTER OUTLINE

A Critical Technique Summary Exercises Case Study

KEY TERMS

Argument - A set of related claims in which one is said to follow from or be based on the others. The two types of claims in an argument are premises and conclusions.

Argument structure - How the premises of an argument are related to the conclusion.

Claim - An assertion or statement capable of being assessed as true or false.

Conclusion - The claim that is to be established or proven in an argument.

Critical technique - The eight-step method of critical thinking presented in this book.

Critical thinking - The ability to correctly validate or refute claims presented for our belief.

Fallacy - An error of reasoning. Do not confuse it with a false claim.

Hidden assumption - An assumption in an argument that is not explicitly stated, but assumed to be true. A hidden assumption is also known as an *unstated premise*, or *logical presupposition*.

Inductive argument - One in which the truth of the premises merely makes the truth of the conclusion more or less probable. Inductive arguments are considered to be strong or weak according to the degree or probability with which the conclusion is established.

Invalid deductive argument - An argument presented as a valid deductive argument, but due to a flaw in the argument's structure, it is possible for all of the premises to be true while the conclusion is nevertheless false.

Meaning - How a word, phrase, sentence, or gesture is understood, as well as how it is used.

Premise - A claim offered in support of the conclusion.

Valid deductive argument - An argument is deductively valid if and only if it is impossible for all of the premises to be true and the conclusion false.

This is a book about thinking. More specifically, it's a manual for thinking critically. Thinking is certainly a very important part of our lives. Our waking hours are filled with thoughts. We might begin the day with a decision about whether or not to push the snooze alarm and end it with the conclusion that we've watched enough television. But if thinking is something that we all do so often, why would anyone need a manual? And why think "critically"?

Our beliefs influence our emotions and our actions. So it is important that they accurately reflect the real world. This is the purpose of **critical thinking**—*to help answer the question of whether or not to adopt a belief*. Critical thinking is concerned with the justification and validation of our beliefs, *not* their origin. The difference between the questions "Where did you get that idea?" and "How do you know that this idea is true?" is significant. The origins of beliefs are studied by psychologists, sociologists, anthropologists, and to some extent physiologists. Regardless of its origin, however, the claim made by any belief can be evaluated critically. So the critical thinker is interested in whether the evidence presented for a claim is true and accurate. She is also interested in the adequacy of the evidence and even the fairness of the argument.

This book is intended to teach you how to think critically. It will do this in the following ways. *First*, it will increase your awareness of the variety of ways that human beings think, reason, justify, explain, rationalize, and persuade. *Second*, this book will provide the tools for sharpening your skills in both evaluating the claims made by others and organizing, presenting, and putting into writing your own arguments. *Third*, a study of this book will enhance your problem-solving and decision-making skills. A *fourth* objective is to foster an appreciation for problems, conflicts, and disagreements such that they become challenges rather than nuisances. The *fifth* aim of this text is to give you the necessary background to approach the reasoning sections of the standardized tests used to screen applicants to law school, postgraduate business school, medical school, and graduate school. *Sixth*, it will provide a foundation for you to enhance your own sense of self-awareness. By developing strategies for detecting unconsciously held prejudices you will be able to refine your judgments.

This book is organized on the basis of what we call the **Critical Technique**. It is a method concerned with both *analyzing* lines of reasoning and *evaluating* their worth. Only by doing the former can we fairly, accurately, and objectively proceed to the latter. The Technique consists of eight questions to be asked when you are evaluating an argument:

A CRITICAL TECHNIQUE

I

WHAT IS THE MAJOR CLAIM BEING ADVANCED?

The first step in the analysis of an argument or a line of reasoning is to determine which claims are being made or advanced. A **claim** is an assertion or a statement someone advances as being true. What claim is the passage trying to make? If you are constructing the argument yourself, what is the point you are trying to make?

2

IS THERE AN ARGUMENT?

Claims are not usually made in isolation. When a claim is presented that someone would have you believe is true, it is usually made in the context of other statements. When a set of claims is brought together in a relationship where some of those claims support another, an **argument** results. The major claim being advanced in an argument is known as a **conclusion**. It is the point of the argument. The conclusion of most political speeches, for instance, is that you should vote for that politician. The other type of claim involved in an argument is a **premise**. A premise is a claim that supports the argument's conclusion. The premises of many political speeches consist of claims that the particular candidate would be best for that office.

Before that argument can be evaluated, its structure must first be determined, and the relationships between the premises and the conclusion established. Several arguments might be employed to advance the same claim. These arguments should be distinguished from one another and the relationships between them determined.

3

WHAT IS NOT BEING STATED?

Finding **hidden assumptions** leads to a better understanding of an argument's implications. These are assumptions made within an argument but not explicitly stated. Hidden assumptions are also known as *unstated premises*. A person's choice of words and the way an argument is presented often influence one's acceptance of an argument's conclusion. These hidden assumptions should be subject to the same scrutiny as the explicit ones.

4

WHAT IS THE MEANING OF THE TERMS BEING EMPLOYED?

Clarifying the **meaning** of words, phrases, and sentences allows one to better understand the meaning of the language being used. It also allows one to construct clearer and less diffuse arguments. An understanding of the meaning of a term or phrase will also help you spot hidden assumptions. In Chapter 4, we present a method for the clarification of the meaning of the words, phrases, sentences, and sometimes even the gestures from which the argument is constructed.

5

ARE ANY FALLACIES INVOLVED?

Once the meaning of the terms is ascertained, the next step is to locate any fallacies employed in the argument. **Fallacies** are forms of bad reasoning that are often accepted by *uncritical* thinkers as good evidence for the conclusion. The content of the argument should also be questioned:

Are the premises relevant to the conclusion? To what degree?

Are the premises true? If you disagree with them, is the disagreement factual, evaluative, interpretive, or verbal?