INSTRUCTOR'S MANUAL
to accompany

Understanding Arguments
An Introduction to Informal Logic

Ninth Edition

Concise Version

Walter Sinnott-Armstrong
Duke University

Robert Fogelin
Dartmouth College

Wadsworth
Cengage

INTRODUCTION

This Instructor's Manual for the Concise Version of the Ninth Edition of *Understanding Arguments* has four main components. First, it contains some suggestions about how to construct a variety of syllabi for courses using the book. Second, it contains supplementary discussions of the philosophical motivations that lie behind the book's approach, some of which are necessarily technical and liable to confuse the introductory student. In this section, the manual also reports our own experience of how students are likely to react to this material—where they will find it easy, where difficult, where interesting, where boring. Third, the manual provides answers to the exercises and some of the discussion questions. Finally, the manual presents a set of classroom-tested questions for tests, with answers.

In addition to this manual, other aids for teachers that are new to this Ninth Edition are the lectures, exercises, and quizzes in the associated MOOC (Massive Open Online Course) titled "Think Again: How to Reason and Argue", which is available for free on the Coursera website and is co-taught with Ram Neta from the University of North Carolina at Chapel Hill. That MOOC (or parts of it) can be used alongside this textbook in order to free up class time for discussion, working through exercises, and related writing assignments. Although this concise version of the textbook was designed specifically to work together with the MOOC, they can also be used independently. Hence, we will not discuss the MOOC further in this instructor's manual, because we realize that some teachers will use the textbook without the MOOC.

In the preparation of this manual as well as in our teaching, we have been aided by two computer programs. The first, named "Venn," was developed by James Moor and Mark Bedau. This elegant and useful program enables students to test their skills in categorical logic by using Venn diagrams to perform a variety of tasks on innumerable examples. The second program, named "Turning the Tables," was developed by James Moor and Walter Sinnott-Armstrong. It teaches students how to use truth tables to test the validity of arguments in propositional logic. Both programs may be obtained at a link to this web site:
http://www.dartmouth.edu/~phil/links/

For help in preparing this instructors' manual, we are very grateful to Gordon Steenbergen.

SYLLABI

The material in this text is written so that it can be presented in many different ways. Of course, it is possible simply to work through the chapters in the order in which they appear in the book. The course then breaks down into four large parts, which correspond to the four parts of the MOOC, Think Again:

A – How to Analyze Arguments (Chapters 1-5)
B – How to Evaluate Arguments: Deductive Standards (Chapters 6-7)
C – How to Evaluate Arguments: Inductive Standards (Chapters 8-12)
D – Fallacies (Chapters 13-17)

Additional applications can, of course, be added from a variety of sources. We sometimes end the course with a discussion of paradoxes to show the limits of reason and argument, and we assign a paper (sometimes in two drafts) on a topic concerning some specific area of reasoning, such as law, morality, science, religion, or philosophy. Teachers can vary the topic from year to year for variety and to stay relevant to issues that are in the news.

Many teachers find that this book contains too much material for a single term, but it is written so that parts can be omitted without disruption. Some teachers might want to skip Part II because their departments offer formal logic in a different course. Similarly, some teachers want to skip the chapters on probability and decision-making, Chapters 11-12, because these are more formal and some students find them difficult. Thus, teachers who find that their students cannot cover all of this material and who want to focus on the less difficult and less formal topics can work through chapters 1-5, 8-10, and 13-17. That reduces the total reading to about 230 pages.

It is also possible to skip some sections within chapters, including the discussion of capital punishment in Chapter 5, Bayes' theorem in Chapter 11, the section on decisions under ignorance in Chapter 12, the discussion of self-sealers in Chapter 16, and several other sections throughout the book. In this Ninth edition, we deleted several sections that many users skipped for various reasons.

The order in which chapters are covered is also flexible. We moved the material in Chapter 1 to its present position, because we found it motivating to start with an important example of an argument, but this chapter could be used, instead, right after Chapter 5, right before discussing inference to the best explanation in Chapter 9, or after Chapter 17 so as to present refutation as another use of argument alongside justification and explanation.

Some professors have found it useful to cover informal fallacies immediately after Part I on informal analysis and before Parts II-III on deduction and induction. These chapters have been written to allow a different order, such as this:

A – How to Analyze Arguments (Chapters 1-5)
B – Fallacies (Chapters 13-17)

C – How to Evaluate Arguments: Deductive Standards (Chapters 6-7)
D – How to Evaluate Arguments: Inductive Standards (Chapters 8-12)

This order puts informal logic up front, and keeps the more difficult chapters for later in the course. Of course, one could also skip formal logic (Part II) when using the chapters in this order.

These are just a few examples of how this book can be presented to students.

SUPPLEMENTARY DISCUSSIONS

In this section of the Instructor's Manual, we outline some philosophical motivations behind this book. We also report how our students have reacted to its various parts. Our goal is to help teachers present this material more effectively.

PART I: How to Analyze Arguments

CHAPTER 1: Uses of Arguments

Like much philosophy, we begin with a definition of our topic. We build on Monty Python's definition, so we often show their skit, "The Argument Clinic," in the first class and then discuss it. This opening teaches students that philosophy can be fun and funny.

The skit and its definition also brings out some crucial points: First, arguments are made up of sentences, statements, or propositions. Although sentences, statements, and propositions differ, the differences are not important at this stage, and we do not want to go into unnecessary detail or to confuse students this early. The main lesson is simply that we cannot fully understand arguments without understanding the language out of which arguments are made.

Second, arguments also need to be understood in terms of their purposes. Here the analogy to artifacts and organs is illuminating, for we also cannot understand pianos or hearts without understanding their purposes. However, whereas pianos and hearts seem to have a single main purpose (music and pumping blood, respectively), we emphasize that arguments are presented for a variety of purposes. This point can be made clearly by contrasting examples, such as political debates versus mathematical proofs where everyone already accepts the conclusion.

We use justification and explanation as examples of two of the main purposes for which arguments are given. This dichotomy is not meant to be exhaustive, of course.

Justifications. This section introduces the distinction between changing people's minds and giving them good reasons to change their minds. Although arguments are sometimes used just as tools to bring about changes in what certain people believe, this is not the only purpose in most contexts, so students need to start wondering about what they want to accomplish when they present an argument and also about what would count as a good reason to change one's mind. In addition, this discussion contains illustrations of some ways in which the force of an argument can depend on its audience. Such personal or dialectical uses of arguments are often denigrated by philosophers, but they are widespread in everyday life, so it is important to teach students to recognize them.

Explanations. Explanations will be discussed in more detail in Chapter 9, which examines inductive inferences to the best explanation. In Chapter 1, our only goal is to impart some sense of how deductive arguments can be used to formulate explanations. Though this chapter considers explanations that take a deductive form, the discussion does *not* contain an unrestricted commitment to a deductive model of explanation. Certain explanations cannot naturally be treated as deductive in form—narrative explanations, for example—and not every sound deductive argument has explanatory force. Still, explanations *often* have the form of a deductive argument, and it is important to see that arguments are often used in this way.

Using arguments to introduce a systematic structure into a subject matter is an activity closely related to explanation, since it allows us to understand interconnections among basic concepts. This is another case where an argument is not used to establish its conclusion, because its conclusion is accepted already. We sometimes discuss this additional use of arguments during a lecture.

Combinations. This section makes a simple point: arguments are rarely simple. Students sometimes find these examples confusing, so we tell them that they are not expected to understand them yet. The goal of the course is to teach them how to do something that they cannot do at the start.

This first chapter does not try to develop a complete theory of justification or explanation. It only illustrates how much arguments vary. A point worth emphasizing here is that it is sometimes but not always okay to use premises that one's audience rejects, and what determines when it is okay is the purpose of the argument. This point shows students that the standards for determining which arguments are good can sometimes depend on the purpose for which the argument is given. This little bit of pragmatism is useful in a course on informal logic.

Since many contemporary theorists claim that reason and argument have little or no real effect on belief and action, it is also useful to show students how much importance some arguments have, so that they will be motivated to continue in the course. There is no better example for this purpose than Colin Powell's argument to the United Nations that played a significant role in getting the United States into the Iraq War (excerpted in the discussion question on pages 13-15). This example is both complicated and controversial. Because it is complicated, it gives students a sense of the complexity of real arguments right from the start in order to motivate them to learn how to break arguments down into parts. Because it is controversial, some students get too wrapped up in their own political positions to analyze arguments about such an emotional topic. We use this tendency to teach a lesson about how hard and yet how important it is to learn how to analyze arguments impartially.

CHAPTER 2: The Web of Language

The underlying assumption of this chapter is that presenting an argument is a *linguistic activity* that is best understood against the background of a theory of how language functions *in general.* The basic theoretical ideas in this chapter come from

ANSWERS TO EXERCISES

PART I: HOW TO ANALYZE ARGUMENTS

Chapter 1: Uses of Arguments

Exercise I (page 6)

1. A prime number is defined as a positive integer greater than one that is not evenly divisible by any positive integer other than one and itself. Nine is evenly divisible by three. Three is a positive integer. Three is neither one nor nine. Hence, nine is not a prime number.
2. A prime number is defined as a positive integer greater than one that is not evenly divisible by any positive integer other than one and itself. Seven is not evenly divisible by two, three, four, five, six, or any positive integer higher than seven. Hence, seven is not evenly divisible by any positive integer other than one and itself. Thus, seven is a prime number.
3. Water is H_2O, so each molecule of water is comprised of two hydrogen atoms and one oxygen atom. Two hydrogen atoms plus one oxygen atom equals three atoms total. Thus, each molecule of water has three atoms in it.
4. Water is H_2O, so each molecule of water is comprised of two hydrogen atoms and one oxygen atom. Neither hydrogen nor oxygen is carbon or comprised of carbon. Thus, water is not made up of carbon. (It is possible for "water", as in a collection of H_2O molecules, to have carbon in it in the sense that carbon atoms are interspersed between the water molecules. However, this still does not mean that water is *made up* of carbon.)
5. The U.S. President lives in the White House. The address of the White House is 1600 Pennsylvania Avenue, Washington, D.C. Thus, the U.S. President lives in Washington, D.C.
6. If the Earth were flat, then it would have edges that you could fall off. The Earth does not have edges that you can fall off. Thus, the earth is not flat.
7. There are multiple videos and first-hand accounts of humans walking on the moon. It is unlikely that all of the videos were forged and that everyone involved has been able to keep a secret for over thirty years. Thus, humans have walked on the moon.
8. Almost all of the bicycles that I have ever seen have had two wheels. I have seen lots of bicycles of many kinds. Thus, most bicycles have two wheels. (Some bicycles have training wheels, but there are many more bicycles without training wheels than with. Notice that this argument is fallible, but it still gives a reason to believe its conclusion.)

Discussion Question (page 7)

Here are four cases:
A – A father may attempt to convince his daughter that lying is wrong, because Santa Clause will not bring her any presents if she lies. Although the father knows that Santa Clause doesn't exist (sorry, Virginia), so the child's lying will not change the behavior of Santa Clause, it still might be legitimate to use the child's belief in an

argument, because the argument gets the child to behave properly, and also might show the child that certain behaviors are wrong, without the need for a complex discussion about morality and ethics that a child would most likely not understand.
B – Imagine that your friend asks for job advice. Your friend wants to improve the world, while you believe that the only important aspect of a job is the salary. You still may advise your friend to take a lower-paying job at a non-profit organization because she will improve in the world. Although you don't believe that this premise justifies picking that job, your argument is still legitimate because your friend has different priorities.
C – While I may believe that pie is better than cake, I can still attempt to convince you to order the chocolate cake instead of the apple pie, since I know you like chocolate and hate apples. In this situation, I don't believe the premise that the chocolate cake will taste better than the apple pie, but I can legitimately make an argument based on that premise given your taste preferences.
D – If someone tries to rob me, I can argue that they should not rob me and should run away immediately, because there are police nearby. This lie might be legitimate, though some might disagree.

Exercise II (page 9)

(1) In countries where flooding is a danger, it is safer to place electrical outlets above floor level. (General principles or laws)
(2) The Netherlands is a country where flooding is a danger. (Initial condition)
———————————————

∴ (3) In The Netherlands the electrical outlets are above floor level. (Phenomenon explained in (1)-(3) and initial condition in (3)-(6))
(4) Colonial settlers tend to preserve their home customs, practices, and styles in their colonies. (General principles or laws)
(5) Indonesia was formerly a Dutch colony. (Initial condition)
———————————————

∴ (6) In Indonesia the electrical outlets are above floor level. (Phenomenon explained)

Notice that the phenomenon explained in the first part of the argument (3) becomes an initial condition in the second part of the argument. In complex arguments, it is common to have conclusions to earlier parts of the arguments become premises of later parts. In this argument, we must first explain why it is a Dutch practice to have electrical outlets above floor level before we can explain why a Dutch colony would have this practice as well.

Exercise III (page 9)

1. The initial conditions are that air has a certain density, as does the balloon, and that the balloon is less dense than the air. The general principle employed here is that, if an object in a liquid or gas is less dense than the liquid or gas, then the object will rise. (This is similar to the law of buoyancy discussed earlier in the chapter.) Together, this general principle and initial conditions explain why a lighter-than-air balloon rises.
2. To explain why there is an international date line, we must first explain why there are time zones. We could mark time so that it is noon at every place around the world

at the same time. However, without time zones, it would be dark at noon and sunny at midnight in some areas. People want to avoid this result, which explains why they set up time zones. Once there are time zones, if there were no international date line, other problems would arise. Imagine that Eve is a meter east of the international date line and Wendy is a meter west of the international date line. It is noon on Monday where Eve is, and Wendy is 23 time zones ahead (east) of Eve, so it is 11:00 a.m. on Tuesday where Wendy is. What if Wendy walks two meters east? She enters a new time zone, so it is noon where Wendy ends up, but which day? Without an international date line, it would be noon on Tuesday where Wendy is located after moving. But Wendy is now standing right next to Eve, so we want to avoid saying that it is noon on Monday for Eve and noon on Tuesday for Wendy. (This would make it hard for them to agree to meet on Wednesday, since they would have to ask each other how many times we have gone around the world, and which direction. Consider also what happens if someone runs in circles one meter south of the North pole.) The paradoxes and practical difficulties that would arise without an international date line are our initial conditions. The general principle is that we set up a system of marking time in order to avoid paradoxes and practical difficulties. This general principle plus the initial conditions explain why we have an international date line. It takes more to explain why we have the particular international date line that we have, that is, why it is located in its current position in the Pacific Ocean.
3. Average temperatures tend to be higher closer to the equator because the sunlight is more direct and passes through less atmosphere.
4. There are usually more college freshman who plan to go to medical school than there are seniors who still plan to go to medical school, because pre-med classes are hard, so many pre-meds switch to another field or track.
5. Almost no textbooks are more than eighteen inches high, because they would not fit in backpacks, so they would be harder to carry, and people would not buy them.
6. Most cars have four tires (instead of more or fewer), because 4 tires provide more stability than 2 or 3, and 4 tires cost less than 6 or more.
7. Paintings by Van Gogh cost so much because he is so well-known and well-loved.
8. Wages go up when unemployment goes down, because there is less supply of workers for the same demand by employers, and because potential employees are not as scared to turn down a job with low wages.

Discussion Question (page 10)

The contention that science tells of *how* but not *why* things happen is correct insofar as it refers to ultimate explanations in terms of basic laws. Science provides no explanation of *why* we have the laws of physics and physical constants that we have, instead of other logically possible laws of physics. These laws tell us only *how* such things happen. Nonetheless, this contention is not correct in that science can and does tell us *why* particular things happen (given scientific laws). For example, science can explain *why* the Earth orbits the sun and not the other way.

Discussion Questions (page 13)

Most of this speech is a justification providing reasons to the UN Security Council why they should believe that Saddam Hussein and the Iraqis are still pursuing nuclear weapons.

In the middle of the speech, Powell argues that there is no adequate explanation of why Iraqis would need aluminum tubes with such high tolerances if they were not going to use them to build nuclear weapons. Assuming that people do not go to so much trouble without a reason, this lack of any other explanation is supposed to justify the belief that the Iraqis were attempting to acquire such tubes for their ongoing nuclear weapons program.

Next Powell describes how magnets *can* be used in a gas centrifuge program and claims that they *were* used for gas centrifuges before the Gulf War. He adds evidence that Iraq *was* trying to obtain balancing machines that *can* be used for enriching uranium. He does not here explicitly say that such magnets and balancing machines cannot be used for anything else that would be legitimate, nor does he provide evidence that the Iraqis have not stopped trying to acquire these magnets and balancing machines before the time of his speech. Still, he seems to be arguing here, as above, that there is no evidence that they have stopped trying to acquire these things and also no other explanation of why Iraq would be trying to acquire such magnets and balancing machines other than to enrich uranium, so this lack of alternative explanation provides a justification for believing that Iraq is attempting to enrich uranium.

*Note that this passage includes many more examples of arguments, including explanations, justifications, and combinations. Not everything from the discussion question is covered here.