Building on some of the critical thinking skills introduced in Chapter 3, Appendix E provides a strategy for determining when the statements in arguments are either true or false. Recall that in Chapter 3 we simply assumed that premises were true when we tested to see whether arguments were either deductive, inductive, or fallacious.

**E.1 DETERMINING THE TRUTH CONDITIONS OF AN ARGUMENT’S PREMISES**

In addition to determining whether nonfallacious arguments—deductive and inductive arguments—ultimately succeed, we must be able to show whether the statements that make up those arguments are true; that is, in the final analysis, we must determine the actual truth or falsity of the statements that make up an argument. So while assuming the truth of an argument’s premises is a necessary step in determining its strength of reasoning, it is not sufficient for determining whether or not an argument succeeds in the final analysis. But how exactly do we determine the actual truth or falsity of the premises in an argument? In other words, what is the verification process?

You may have noted that in many of the sample arguments we considered in Chapter 3, some premises contained empirical claims while others contained normative claims. One might assume that the truth or falsity of empirical claims could be resolved in a relatively straightforward manner but that the truth or falsity of normative claims would be much more difficult to determine, if indeed their truth conditions could be determined at all. Arguments involving moral issues, of course, typically include premises whose claims are normative. We must be able to verify the truth of those claims, as well as descriptive or empirical claims, in order to determine whether arguments ultimately succeed.

In Chapter 2, we saw that scientific methodology proceeds by way of empirical observation, while philosophical methodology proceeds by way of conceptual analysis. Thus different verification schemes are used in each case. Because of challenges posed by the verification of certain kinds of normative claims, some might infer that an attempt to
resolve such challenges is futile. One might assume that whereas science deals with facts, ethics deals with opinions. We next critically examine the fact-opinion distinction to see if it is useful in helping us to understand better the challenges posed by the verification of the normative claims in ethics vs. the verification of empirical claims in science.

E.2 THE FACT-OPINION DISTINCTION

Categorizing claims as either fact or opinion might seem useful; the ability to distinguish between facts and opinions is sometimes considered the hallmark of critical thinking. But is the distinction legitimate and straightforward, or does it prematurely shut down important discussions involving both normative and empirical claims?

The term “fact” demands a certain respect, or consideration, that mere opinion or belief does not. Consider how we view “facts”: Sgt. Friday, a detective in the classic television series Dragnet, characteristically interviews a witness by asking for “the facts, ma’am, just the facts.” Several years ago Newsweek magazine took on its main competitor, TIME magazine by insisting that Newsweek separated fact from opinion. We won’t examine whether or not this claim is true. And we still seem to have a fascination with allegedly factual data—CNN Headline News, for example, includes “factoids” (consisting of statistical data, some of which might seem trivial) as sidebars while broadcasting the news. As a society, we seem consumed, maybe even obsessed, with “factual” and statistical data. But what exactly are facts, and how are they different from opinions?

Are facts absolutely true and irrefutable? Since scientific claims consist of data that is observable and measurable, are the claims of science factual? Are the claims of mathematics factual? Mathematical principles, like those of logic, are nonempirical—that is, they cannot be observed, at least not directly by any of the senses (such as sight or hearing). And are all claims involving values necessarily reducible to opinions? Note that we tend to dismiss any claims that appear to “smack of opinions,” while we presume that any so-called factual claims are either incontestable or irrefutable. By identifying a claim as simply “opinion,” we can treat it as less worthy of serious investigation or analysis than assertions that we consider factual. But it might be dangerous to do this. Consider the following case illustration:

CASE ILLUSTRATION: Evidence in the O. J. Simpson Trial

In the highly publicized O. J. Simpson trial (1995), defense attorney Barry Sheck cross-examined a DNA expert who testified against Simpson. The witness claimed that the DNA evidence under consideration was indeed O. J. Simpson’s, but Sheck skillfully appealed to the commonly-held distinction between facts and opinions to sway the jury. When he confronted the DNA expert, Sheck said, “It is your opinion that this is Simpson’s DNA, correct.” He then went on to reiterate: “That is your opinion, right.” Since the expert had to admit that she was not absolutely certain—i.e., she could be only about 99.5% certain—that the DNA in question was Simpson’s, her testimony appeared less than completely credible. The prosecutions’ leading DNA witness was made to look as if she were able to offer nothing more than a personal opinion although, of course, she was offering a professional and scientifically based judgment, or “opinion,” if you prefer. This approach for undermining the prosecution’s evidence by framing the witness’s testimony as a mere “opinion” turned out to be a brilliant rhetorical move by Simpson’s defense team—we can well imagine how it might sway a jury.
In fairness to the prosecution witness and to her testimony as credible and reliable evidence, we must ask whether we could ever be absolutely certain about DNA evidence. For that matter, can we be certain of any testimony based on scientific evidence? Is the nature of science and scientific evidence such that it must be absolutely certain? Or does it rest on strong inductive probability? And if the DNA expert’s claim is just an opinion, then aren’t virtually all scientific claims just “opinions”?

Although the Simpson case is an isolated incident, it would be prudent to draw a clearer distinction between fact and opinion. Categorizing claims as either fact or opinion can engender an intellectual laziness, so we should be cautious about simply lumping together all empirical claims and placing them in the factual realm, and we will see that there are good reasons for not dismissing all normative claims as opinions. We next consider which criteria are essential for verifying empirical claims and which are necessary for normative claims.

### E.3 ARE EMPIRICAL CLAIMS NECESSARILY FACTUAL?

Consider the following empirical claim:

(1) The distance from the earth to the sun is 93,000,000 miles.

Is this claim factual? Is it empirically true? Many people, including most scientists, believe that it is. Of course, a person’s belief that a particular claim is true does not make that claim true. And this claim could eventually be shown to be false—consider that at one time many educated people believed assertions such as “The earth is flat.” In science, theories and beliefs held to be true in one era and under one conceptual framework are sometimes disproved and discarded. One virtue of science is that it is an “open-ended” inquiry, subject to revision. So if at some future date there is sufficient evidence to suggest that the sun is really much closer or much farther away than 93,000,000 miles from our planet, scientists will no longer hold claim (1) to be true. What, then, can we say now about the status of such a claim if in the future it turns out to be false? Should we say that although today (1) is a fact, it could become a “false fact” in the future? Would that make any sense? And if it could become a “false fact,” does this make it an opinion? Was (1) ever a fact in the first place? And if so, was it a fact merely because the majority of people might have believed it to be true? Because certain statements that were once believed to be true have since been shown to be false, does that mean that facts themselves can change? Does such a claim make any sense at all?

Next consider the claim:

(2) There were 52,000 cases of anorexia in the United States in 2001.

Supporters of the fact-opinion distinction would reason that (2) is a fact. Does claim (2) have all of the essential ingredients for being factual? Not necessarily. If a conservative political organization were to claim (2), it might base its claim on one standard, while a more liberal women’s organization might assert that there were more than 200,000 cases of anorexia according to their (different) standard. So while claim (2) might at first appear to be a straightforward and uncontroversial assertion based on seemingly irrefutable empirical data, it could, surprisingly, turn out to be far more controversial than the nonempirical, or normative, claims. Some may be surprised to discover that assertion (2), an empirical
claim, is a much more difficult claim to verify than many normative assertions, such as
those we will consider in the next section.

Normative claims often include value terms such as “good,” “bad,” “right,” “wrong,”
“should,” “better,” “outstanding,” etc. We have noted that in our popular culture, we believe
that opinions contain value terms and are therefore subjective while facts are based on
empirical data and are therefore objective. But a little reflection can show that this rationale
for separating facts (as empirical claims) from opinions (as normative claims containing
value terms) is problematic.

E.4 ARE NORMATIVE CLAIMS MERELY OPINIONS?

Consider the following assertions:

(3) Ken Griffey Jr. is an outstanding baseball player.
(4) Safety-critical software applications should be tested more thoroughly than non-
critical software applications.

Are (3) and (4) both opinions because (3) happens to contain the value term “outstanding”
and (4) contains the value term “should”? Unlike (1) and (2) earlier, neither (3) or (4) con-
tain purely descriptive or statistical data. But we have seen that (1) could eventually be
shown to be false and that (2) is controversial and problematic; it depends upon the standards
used to verify its claim. Yet some would seem willing to call both (1) and (2) facts merely
because they contain empirical and statistical data (after all, they might say, “Numbers don’t
lie.”). But if both (3) and (4) can be shown to be true statements, would they then be facts?

Consider claim (3): Despite whatever you feel personally about Griffey as an athlete,
and despite what you might think about him as a human being, independent and objective
statistics reveal that his performance as an athlete qualifies him as an outstanding baseball
player. So (3) seems to qualify as a factual claim.

Consider claim (4). Virtually everyone would agree that poorly designed or malfunc-
tioning safety-critical software applications and safety-critical computer hardware systems
could cause the deaths of thousands of persons and so such software and hardware should
require more rigorous and more extensive testing than non-life-critical applications.
Although everyone might not agree as to what exactly constitutes rigorous and extensive
testing, still they generally agree with claim (4). Like (3), (4) is a normative claim, and it
also appears much easier to verify than an empirical claim such as (2). And unlike both (2)
and (3), (4) has moral implications.

As I write this appendix, the United States Congress is debating the future of the
American Social Security System. Both sides in the debate—that is, members of both major
political parties—agree with the following normative claim:

(5) The Social Security Program should be reformed.

Liberals and conservatives disagree, however, on the so-called facts regarding exactly when
the current Social Security System will go broke. One group asserts:


The other side claims:

(7) The Social Security System will run out of money in 2038.
Note that both (6) and (7) purport to be factual, but there is a heated dispute over the “fact” regarding just when the current social security system will become bankrupt. Ironically, both sides agree with the normative claim that the Social Security System should be reformed. So case (5) as well as in cases (3) and (4), agreement involving normative assertions was reached more easily than it was in certain empirical claims that purported to be factual. And assertions (2), (6), and (7) illustrate how arbitrary and misleading alleged factual claims can be, so the distinction between empirical claims and normative claims cannot simply be reduced to a distinction between facts and opinions.

E.5 VERIFYING NORMATIVE CLAIMS

So we cannot simply equate empirical claims with facts (that are necessarily true assertions) and normative claims with opinions (that cannot be verified to be either true or false). We have seen that empirical claims, including scientific claims, such as (1) and (2) can be false, and we have seen that normative claims, such as (3), (4), and (5) can be true. But, we might ask, how can we determine the truth or falsity of normative claims?

Unlike empirical claims, the truth or falsity of normative claims typically cannot be directly determined through observation. We must first clarify the meaning of certain concepts before we can perform the verification test. Consider the following two normative claims involving operating systems and software applications:

8. Linux is a better operating system than Windows NT.
9. Java is superior to C++ as a programming language to design Web applications.

How can objective standards, acceptable within and outside the computer industry, be used to verify these two claims as either true or false?

At first, it might seem that we cannot resolve these claims beyond the level of personal belief or opinion. How can we say that some X is better than some Y? But we do this all of the time—consider again our earlier claim (3) involving Ken Griffey Jr. Suppose that we changed our assertion about Griffey to “Ken Griffey Jr. is a better baseball player than Sammy Sosa.” Couldn’t we compare the statistics regarding both Griffey’s and Sosa’s individual performances as baseball players to settle this matter, independent of our personal likes or dislikes? And we could also use this technique to determine whether Griffey is an outstanding baseball player or whether he is even a good baseball player.

If someone asserts that Griffey is a good baseball player, you can always respond by asking, Why? That is, you can ask, “By what criteria, or by what standards is it the case that Griffey is a good baseball player?” The person making the assertion about Griffey could then reply that Griffey has consistently performed at a certain level; for example, he has

- consistently maintained a batting average higher than 300 for N number of seasons,
- hit more than forty home runs per year for N number of years,
- received N number of Gold Glove awards, and
- led the American League in “slugging percentage” N number of times.

Someone might disagree with our original claim (3), that Ken Griffey Jr. is an outstanding baseball player, saying that he does not particularly like Griffey, or that Griffey is a showoff, or that Griffey is more interested in his own personal success than he is in per-
forming as a team player. But you could reply that that none of these responses have anything to do with whether the claim “Griffey is an outstanding baseball player” is true or false. At this point in the debate, you would be disagreeing about the set of criteria relevant to verifying the claim at hand. But those who are knowledgeable about baseball will no doubt agree that one’s batting average, home run record, etc., are the relevant criteria in determining whether someone is a good baseball player, and they would also likely agree that a player’s moral character is irrelevant in making that determination.

Consider that many people who disapprove of Pete Rose’s conduct with respect to gambling still believe that he was a good baseball player. And those who believe that he should not be admitted into baseball’s Hall of Fame do not argue that Rose lacks the necessary credentials as a baseball player, but instead claim that he lacks personal integrity, also a consideration for entrance into the Hall of Fame. So it is possible for someone to assert, “Pete Rose was a good baseball player, but I don’t like him” without any inconsistency. Of course if the claim “Rose was a good baseball player” were equivalent to the claim “I like Pete Rose,” then the previous assertion would not be consistent. So like empirical claims, normative claims can also be debated and resolved using objective criteria.

The same kind of moves that were made in determining the truth or falsity of normative claims involving Pete Rose, Sammy Sosa, and Ken Griffey could be made in the case of claim (8), involving the Linux and NT operating systems, and claim (9), involving Java and C++ programming languages. Although you may have a personal opinion about which operating system or about which programming language is better, to justify your claim that one is superior to the other you need to provide evidence that is relevant and appropriate. Of course, the relevant criteria for what makes someone a good baseball player will be radically different from evidence that makes something either a good operating system or a good programming language. And, of course, the criteria whether a particular programming language is a good one will be different from criteria essential for establishing something as a good operating system, even though operating systems and programming languages both have to do with computers.

Consider that we do make claims or judgments about which programming languages are better than others. And we often justify such claims with criteria based on attributes that are more than mere personal preferences. For example, the claim that Linux is a better operating system than NT is different from either of the following two claims:

(10) I believe that Linux is a better operating system than NT.
(11) I like the Linux operating system better than NT.

Note that statement (10) and (11) are both empirical, rather than normative claims, despite the fact both assertions include the normative term “better.” Both statements are empirical because they simply report or describe beliefs or likes and dislikes; as such, they can be verified directly by asking what the individual who asserts the claim believes or likes. Note that neither (10) nor (11) claim, independent of the person making those assertions, that Linux is, in fact, a better operating system than NT. In this sense, (10) and (11) are both different from (8), which asserts “Linux is better than NT.” To see that (8) is significantly different from both (10) and (11), consider that it is possible for one to assert:

(12) “Linux is better than NT, but I (personally) prefer NT.”
In this case, the person reveals his or her preference for Windows NT as an operating system, even though he or she also asserts that Linux is better than NT. So statements (10), (11), and (12) are all three empirical and thus very different from statement (8), a normative claim.

Consider normative claim (9) involving Java and C++. We can show that (9) is much more than a personal opinion involving preferences, but how do we adjudicate between programming languages? We can show that C++ is superior to earlier, nonstructured programming languages such as Fortran and Cobol, even though all three languages could be used to write some computer applications. We can also show why certain techniques used in designing code are better than others: A programmer could write a routine for a particular application that contains 5,000 lines of instructional code, and another programmer might write a routine that accomplishes the same task but contains only 500 lines of code. All things being equal, the latter would clearly be a better program, since it would likely have fewer mistakes and would therefore be easier to maintain. Programs could also be evaluated on grounds other than the number of lines a programmer uses; for example, “baroque code” and “spaghetti code” are valued less than programming code that is streamlined and “elegant.”

We can give reasons, then, why some programming languages are better than others, why some operating systems are better than others, and why some baseball players are better than others. And these reasons can be based on relevant criteria that meet objective standards and that are not merely reducible to personal preferences and tastes. In supplying evidence for normative claims, we are able to verify the truth and falsity of those claims by a scheme that is significantly different from the one used to verify the truth or falsity of empirical claims. Empirical claims can be verified by observation, while normative claims can be verified indirectly via supporting evidence. Because moral claims are a subset of normative claims, they can be verified in the same way that normative claims can.

Recall the seven-step strategy for evaluating arguments, which we introduced in Chapter 3. At two points in that scheme—Steps 4 and 7—you were asked to determine the truth-conditions of the argument’s statements (in the actual world). You now have some strategies for carrying out those tasks and thus completing the process for determining when an argument ultimately does or does not succeed.