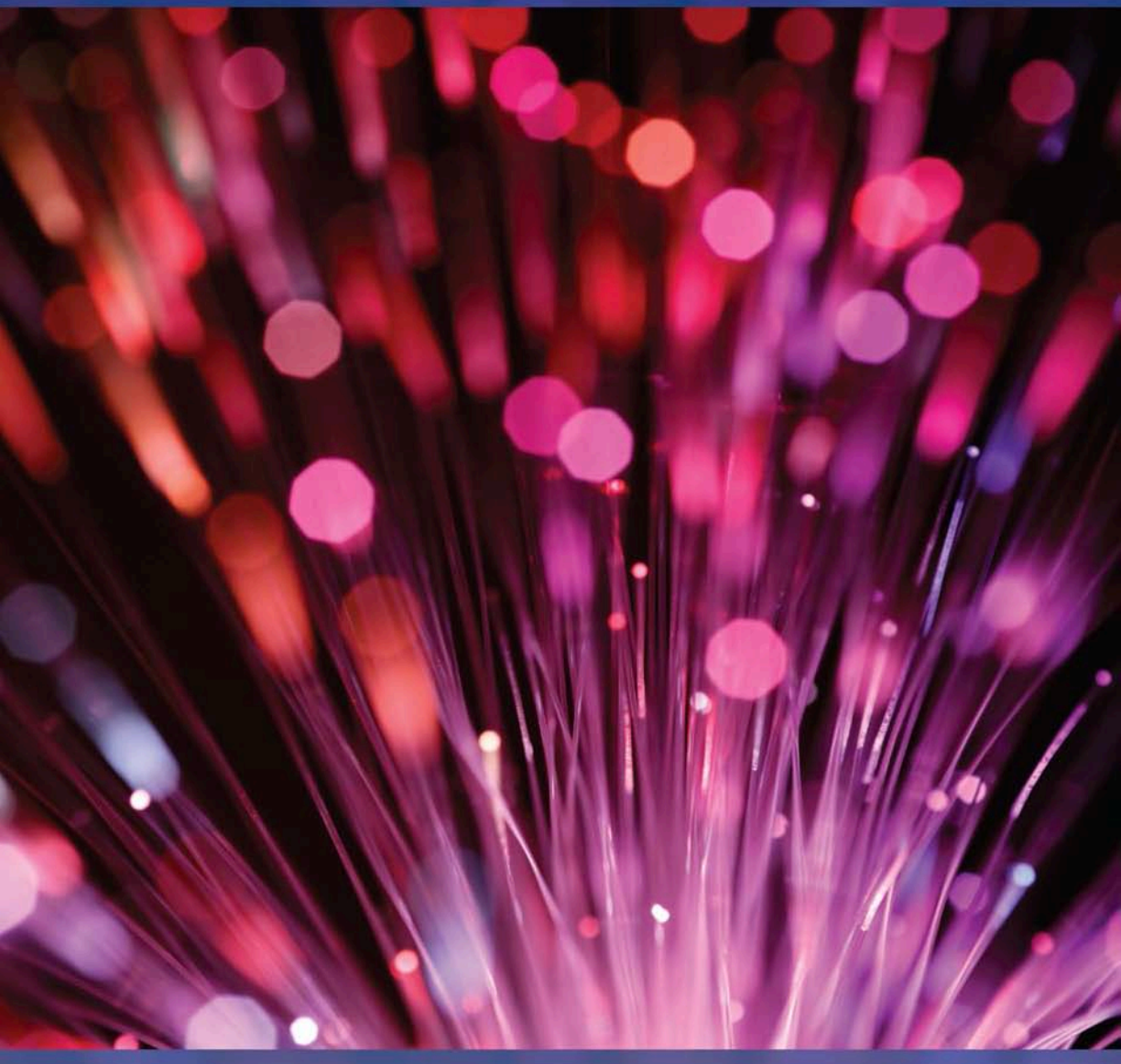
BECOMING A CRITICAL THINKER

EIGHTH EDITION



VINCENT RYAN RUGGIERO

THE W.I.S.E. APPROACH TO THINKING

WONDER	Reflect on your experiences and observations and identify challenges that are worth addressing. (Unlike the next three steps, this one does not begin or end with particular challenges but is ongoing.)
INVESTIGATE	Acquire information about a particular challenge you identified by wondering, so that you can reach the understanding needed to solve the problem or resolve the issue.
SPECULATE	Identify possible solutions to the problem or arguments about the issue.
EVALUATE	Test the possible solutions or the various arguments and decide which are most worthy.

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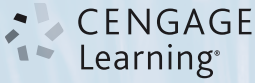

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TO THE INSTRUCTOR

When first published in 1989, this book was designed to meet a then unmet need—to provide an introduction to critical thinking for students whose programs of study did not require or allow for a standard, philosophical introduction to critical thinking.

This design permitted greater latitude than would have been possible with a standard text. I was able to omit some topics that would have been expected in a standard text. A notable example is the distinction between inductive and deductive thinking, which many thinkers, including a fair number of logicians, have come to regard as a distinction without a meaningful difference. They believe that the terms *inductive argument* and *deductive argument* are essentially artificial and tend to obscure the fact that most arguments include *both* inductive elements (movements from the particular to the general) *and* deductive elements (movements from the general to the particular).

The greater latitude also permitted the inclusion of topics that are thought to "belong" to fields other than philosophy or logic. For example, the subject of Chapter 4 is individuality and the role that habits and attitudes commonly associated with psychology play in shaping our thinking. I have also been able to address more expansively the various *applications* of critical thinking (see Chapter 7).

Over the years, some instructors in standard critical thinking courses have found that this book is more appropriate for their students than one of the many standard critical thinking texts. Where their syllabi have required coverage of a topic not covered here (such as the inductive and deductive distinction), they have provided their students with supplementary material or created Internet research assignments.

SIGNIFICANT CHANGES TO THE EIGHTH EDITION

- **Investigating issues.** The treatment of investigating issues (Chapter 3) has been expanded.
- **Individuality and the W.I.S.E. approach.** The connection between using the W.I.S.E. approach and the strengthening of individuality has been reinforced.

- **Linking chapters.** The concepts and approaches in several chapters have been linked by the use of a single extended illustration: the highly publicized case of the White Plains, New York, *Journal News*'s publication of the names and addresses of more than 33,000 legal gun owners. The case is introduced in Chapter 1 and then revisited and expanded in Chapters 3 and 4.
- **New exercises.** A number of timely new cases have been added as exercises for students' critical thinking. They include the following:

  Governmental bans on soft drinks, trans fats, bake sales, and lemonade stands, and new mandates for school lunches

  Multitasking pros and cons

  Party-line voting vs. issue voting

  A North Dakota woman marrying herself

  Apparent decline of leadership in government

  Government "redistribution of wealth"

  Proposed expansion of U.N. powers

  Effect of communications technology on conversation

  Social justice

Fundamentals of Thinking

1

IN THIS CHAPTER

▶ What is intelligence?	*Intelligence is, most importantly, something you do.*
▶ What is thinking?	*Thinking is a purposeful mental activity. You control thinking, not vice versa.*
▶ Key principles of thinking	*Six reliable ideas provide the foundation for thinking.*
▶ Key habits and skills of thinking	*This chapter presents habits and skills that will make you a more effective thinker.*
▶ The need for a systematic approach	*Having a simple but comprehensive approach can make you a more effective thinker.*

WHAT IS INTELLIGENCE?

In a scene from the movie *Forrest Gump*, Forrest is sitting on a bench next to an old man who asks him rudely, "Are you stupid?" Forrest gives the man his most dignified look and responds politely, "Stupid is as stupid does, Sir." This isn't just a clever comeback; it is a profound truth. And the corollary is also true: "Smart is as smart does." Intelligence isn't just something we *have*. It is, more importantly, something we *do*. Unfortunately, this has not always been understood.

A century ago, most prominent psychologists believed that intelligence is fixed and unchangeable—that everybody is born with a certain "amount" that can never be increased. These psychologists argued that since the mind cannot be improved, education should not try to teach students *how* to think but should instead *tell them what to think*.[1] Not surprisingly, this belief had

[1] The most influential of these individuals included H. H. Goddard, Lewis Terman, Edward Thorndike, and Robert Yerkes. To learn more about their ideas, go to www.google.com and enter their names. Incidentally, Terman was the creator of the Scholastic Aptitude Test (SAT).

Digital Vision/Photodisc/Getty Images

a significant effect on instruction. Education associations urged teachers to lecture students and emphasize memorization and regurgitation of information rather than evaluation and judgment.[2]

The psychologists theorized that some nationalities and races are "intellectually inferior" and conducted tests to prove their thesis. The most widely publicized efforts were the Army's Alpha and Beta Intelligence Tests.[3] Though later revealed to be unscientific and badly flawed, at the time their pessimistic conclusions were considered the definitive measure of human intelligence and influenced every social agency. Legislators enacted immigration laws that discriminated against entire nations and regions. Business leaders demanded that workers follow procedures set by industrial engineers and "leave their minds at the company gate." Advertisers aimed at people's emotions rather than their minds. Journalists avoided complexity and simplified their reporting.

The effects of this negative view of intelligence lasted for decades and in some ways are still with us. That is why you, like many others, may have learned to associate intelligence only with *factual knowledge*. In this view, the mind is little more than an information warehouse, with the size varying from person to person; those with the greatest capacity are "walking encyclopedias" who can answer all the questions in class and win prizes on game shows.

There's nothing wrong with possessing information, of course. (It certainly beats ignorance.) But the human mind is capable of much more than passively receiving and storing information. It has the potential to seek out and evaluate ideas, then use them to solve problems, resolve issues, and meet everyday life challenges. In a word, the human mind has the potential for *thinking*. And the more a person develops this potential, the more intelligent he or she becomes. This is not mere wishful thinking. Over the last century, many scholars and researchers have proved it to be true.[4]

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[2] See, for example the especially significant *Cardinal Principles of Secondary Education*, advanced by the National Education Association in 1918, which can be found on the Internet using the search term "NEA Cardinal Principles."

[3] For more information, do an Internet search using the terms "Army Alpha and Beta Tests" and "Robert Yerkes."

[4] Here are a few of the individuals whose contributions you may wish to explore further: Bernadine Schmidt, Reuven Feuerstein, J. P. Guilford, Mary Meeker, Alma Brewer, Howard Barrows, E. Paul Torrance.

GOOD THINKING!

The Story of Albert Einstein

Few people deserve the title "genius" more than Albert Einstein. His theory of relativity is one of the greatest intellectual achievements in human history.

Academically, however, Einstein was less than mediocre. One teacher told him he would "never amount to anything." Eventually, he was asked to leave school.

After spending some time traveling in Italy, Einstein applied to the Zurich Polytechnic School. He failed the admissions exam, and was required to return to high school for a year before being accepted. On graduating from Zurich he was rejected for an assistantship because no professor would give him a recommendation. He managed to get a job as a tutor but was soon fired.

Some years later, while working at odd jobs, Einstein submitted a doctoral thesis to the University of Zurich, but it was rejected. He eventually got a job in the patent office. In his spare time, he continued his studies, quietly earned a doctorate, and began publishing his scientific findings. Finally, after many years in relative obscurity, his work won him the recognition he deserved.

If Einstein had accepted his teachers' assessment of his intelligence, he would undoubtedly have lost the motivation to pursue his studies, and the world would be unimaginably poorer.

For more information on Albert Einstein, see www.nobel.se/physics/laureates/1921/einstein-bio.html.

Are there limits to intellectual potential? Undoubtedly. Do some people have greater potential than others? From all indications, yes. But the more salient fact is that we can never know our potential until we have tried to develop it. This entails working beyond initial failures. After all, how many of us became proficient at jumping rope, riding a bike, playing tennis or the clarinet, or driving a car after one or two—or one hundred and two—attempts?

WHAT IS THINKING?

Imagine that you are staring into space, picturing yourself heading for the airport. You see yourself ready for a month's cruise in the Caribbean, your pockets stuffed with cash. Would this mental process be thinking?

Now imagine that you're discussing politics with friends. "It's always the same with politicians," you say. "They're full of promises until they're elected. Then they develop chronic amnesia." Would you be thinking in this case?

Thinking, as we will define it in this book, is a purposeful mental activity. You control it, not the reverse. For the most part, thinking is a conscious activity. Yet the unconscious mind can continue working on a problem after conscious activity stops—for example, while you sleep.

Given this definition, your ruminations about a Caribbean cruise are not thinking but daydreaming; you are merely following the drift of your fantasies. On the other hand, your discussion of politics could constitute thinking, as long as you aren't just repeating something you've said or heard before.

There are three broad dimensions of thinking: the *reflective* dimension ponders experience and identifies challenges; the *creative* dimension produces relevant ideas for meeting challenges; and the *critical* dimension evaluates the ideas and decides which is best. Although the three dimensions are sometimes considered separately, the term "critical thinking" is often used to refer to them collectively. That is how we will use it in this book. Chances are you received little or no critical thinking instruction in high school. If so, your teachers were not to blame; they, and their teachers before them, were probably denied such training, largely because of the false notion that thinking can't be taught, or the equally false notion that some subjects teach thinking automatically.

Thinking can be taught, and not just to "gifted" students but to all students. No course automatically teaches thinking, though any course can teach it when teachers make thinking skills a direct objective and give students regular practice in producing and evaluating ideas.[5] Such instruction benefits students in their studies, their careers, community service, and personal relationships. According to psychologist Albert Ellis, "[People] can live the most self-fulfilling, creative, and emotionally satisfying life by intelligently organizing and disciplining [their] thinking."

Unfortunately, shallow, illogical thinking is common. For example, a drug or alcohol abuser may tell himself, "I'm not addicted—I can quit any time I want." A painfully thin anorexic may persuade herself that she is grossly overweight. Even highly educated people may reason that they can never contract a sexually transmitted disease if they have sex only with "nice people." Abusive parents may think that screaming and hitting are appropriate ways of disciplining children.

[5] In *An Experiment in the Development of Critical Thinking,* first published in 1941, Edward Glaser cited more than 340 studies bearing on this and related questions. In subsequent decades, hundreds more studies on critical and creative thinking confirmed his conclusion.

"I never heard of anyone pulling a muscle while thinking."

Marty Bucella/Cartoon Bank.Com

There are even worse examples of poor thinking. A woman doused her husband with rubbing alcohol and set him on fire because he had been acting crazy and refusing to work. She reasoned that by setting him on fire, she'd get him into the hospital for some help. A father kept his 18-year-old daughter chained in the basement because he was afraid she would become a prostitute. An elderly woman robbed a bank, then jumped on her *three-wheel bike* and pedaled away, believing that police could never catch her. (They caught her a couple of blocks from the scene.)

Thinking errors as extreme as these are easy to recognize. Others are more difficult, especially when the ideas are our own rather than other people's. And the most difficult to discern are those enshrined in popular culture. It's easy to assume that other people have examined such ideas and found them worthy, when that may not be the case. For this reason, we should question most vigorously the ideas we are tempted to take for granted—familiar, fashionable ideas.

KEY PRINCIPLES OF THINKING

Thinking is like building a house or a skyscraper—the success of the enterprise depends on the firmness of the foundation. The foundation of thinking, of course, is not concrete and steel but *principles*—ideas that have

survived rigorous testing and proved trustworthy. The following principles of thinking are among the most important:

Truth is discovered, not created

You have probably heard it said that truth is subjective and personal, or that each person creates truth to his or her own specifications. This belief is common today, and it means that believing something is so *actually makes it so*. In other words, reality is whatever we wish it to be.

This idea directly contradicts the view that has been generally accepted since ancient times—the view that *truth is the accurate representation of objective reality*. In this view, reality is unaffected by our wishes, preferences, and assumptions.

Is the new view that truth is created and subjective more reasonable than the traditional view that truth is objective? Perhaps the best way to tell is to consider what the new view of truth implies about everyday issues. *If truth is created by each person, then. . .*

> . . . Galileo's assertion that the sun is the center of the solar system, a view that shocked most people of his time, is not true for everyone but just for those who want to believe it.
>
> . . . those who believe that the earth is flat, the Holocaust never happened, and Saddam Hussein was a benevolent leader of his people are correct. And so are those who take opposite views.
>
> . . . when a drunk falls into an empty swimming pool thinking that it is full, water will suddenly appear and save him from a hard landing.
>
> . . . the standard courtroom oath—"I swear to tell the truth, the whole truth, and nothing but the truth"—is outdated. Witnesses should be allowed to testify to their own personal truth, and no one's truth should be considered superior to anyone else's. Moreover, since defendants' pleas of not guilty are equal to prosecutors' claims of guilt, all court cases should be dismissed.
>
> . . . it is a waste of time for archeologists to dig for proof of lost civilizations, for medical researchers to search for the causes and cures of diseases, for historians to pore over dusty manuscripts for clues to the past, and for students to read textbooks like this one. Instead, they should simply decide what they want to believe and—presto!—it will become reality.
>
> . . . all your incorrect answers on past true or false tests should be marked correct and your grade-point average raised accordingly.

As even these few examples make clear, the notion that truth is created by each individual does not hold up under scrutiny. But the Good Thinking profile of Nellie Bly on this page adds another example. When she traveled about the world doing her investigative work, she was clearly not looking to create the truth but, rather, to discover it.

GOOD THINKING!

The Story of Nellie Bly

Her real name was Elizabeth Cochrane, and she was born in 1864 in Pennsylvania. When she was six years old her father died, and her mother had to raise Elizabeth and her fourteen brothers and sisters by herself. At sixteen, Elizabeth moved to Pittsburgh to find work. One day in 1885 she read a newspaper article advancing the traditional argument that "a woman's place is in the home." She wrote a response that so impressed the editor that he hired her. She then took the name Nellie Bly and began her remarkable career.

Nellie had an active, inquiring mind that served her well in her specialty, investigative reporting. She wrote articles on marriage and divorce, and helped to initiate important legal reforms. She traveled in Mexico and wrote about exposing the political corruption and widespread poverty. She had herself committed to a New York asylum for ten days so that she could expose the terrible conditions and the inhumane treatment of the inmates. Later she traveled around the world hoping to set a new speed record. She succeeded.

Nellie left journalism to marry an industrialist. When he died ten years later, she took control of his company and won praise for her enlightened treatment of her employees. At a time when workers typically labored long hours in unhealthy sweatshops for low pay, she provided her workers with health care, libraries, and gymnasiums.

Eventually, Nellie returned to reporting. While she was on holiday in Europe, the First World War broke out, and she immediately volunteered to be a war correspondent for the *New York Journal*. She became the first female correspondent to cover a war from the front lines. After the war, Nellie returned home and wrote a newspaper column until her death of pneumonia in 1922.

For more information on Nellie Bly, see http://az.essortment.com/nellyblybiogra_rsls.htm or www.library.csi.cuny.edu/dept/history/lavender/386/nellie.html.

Ideas are interrelated[6]

When one idea is expressed, closely related ideas are simultaneously conveyed, logically and inescapably.[7] In logic, this kinship is expressed by the term *sequitur*, Latin for "it follows." (The converse is *non sequitur,* "it does not follow.")[8]

Consider, for example, the idea that many teachers and parents express to young children as a way of encouraging them: "If you believe in yourself, you can succeed at anything." From this it follows that *nothing else* but belief—neither talent nor hard work—is necessary for success. The reason the two ideas are equivalent is that their meanings are inseparably linked. (Note: The statement "belief in oneself is *an important element* in success" is different because it specifies that belief is not the only element in success.)

In addition to conveying ideas closely linked to it in meaning, an idea can *imply* other ideas. For example, the idea that there is no real difference between virtue and vice implies that people should not feel bound by common moral standards. Samuel Johnson had this implication in mind when he said: "But if he does really think that there is no distinction between virtue and vice, why, Sir, when he leaves our houses let us count our spoons."

If we were fully aware of the closely linked meanings and implications of the ideas we encounter, we could easily sort out the sound ones from the unsound, the wise from the foolish, and the helpful from the harmful. But we are seldom fully aware of the linkages. In many cases, we take ideas at face value and embrace them with little or no thought of their associated meanings and implications. In the course of time, our actions are shaped by those meanings and implications, whether we are aware of them or not.

To appreciate the influence of ideas in people's lives, recall the series of events that followed the psychologists' declaration that intelligence is fixed and unchangeable. Teachers changed their classroom methods, legislators changed immigration laws, business leaders changed their attitude toward workers, and advertisers and journalists changed their approaches to the public.

The influence of the psychologists' idea about intelligence did not end there. It also encouraged eugenicists to intensify their efforts to save the human

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[7] Peggy Rosenthal offers a slightly different explanation of the same phenomenon: "Even when we think we are choosing our words with care and giving them precise meanings, they can mean much more (or less) than we think; and when we use them carelessly, without thinking, they can still carry thoughts. These thoughts we're not aware of, these meanings we don't intend, can then carry us into certain beliefs and behavior—whether or not we notice where we're going." *Words and Values: Some Leading Words and Where They Lead Us* (New York: Oxford University Press, 1984), viii.

[8] One example of *non sequitur* is a child's answer to his teacher's question "Why do you get so dirty during playtime?" He responded, "Because I'm closer to the ground than you are." Another is the conclusion of a medical authority in 1622 about the treatment of a wound: "If the wound is large, *the weapon* [emphasis added] with which the patient has been wounded should be anointed daily; otherwise, every two or three days." The medical quotation is from Christopher Cerf and Victor Navasky, *The Experts Speak: The Definitive Compendium of Authoritative Misinformation* (New York: Villard, 1998), 38.

race from people presumed inferior. Margaret Sanger's Planned Parenthood urged the lower classes to practice contraception. Others succeeded in legalizing forced sterilization, notably in Virginia. The U.S. Supreme Court upheld the Virginia law with Justice Oliver Wendell Holmes, Jr., declaring, "Three generations of imbeciles are enough."[9] Over the next five decades 7,500 women, including "unwed mothers, prostitutes, petty criminals and children with disciplinary problems," were sterilized.[10] In addition, by 1950, more than 150,000 supposedly "defective" children, many relatively normal, were held against their will in institutions. They "endured isolation, overcrowding, forced labor, and physical abuse including lobotomy, electroshock, and surgical sterilization."[11]

The innumerable ideas you have encountered may not affect your life quite so dramatically, but they will influence your beliefs and behavior, for better or worse, even if you do not *consciously* embrace them.

A statement can't be both true and false at the same time and in the same way

This principle is known as the principle of contradiction. The following examples demonstrate the validity of this principle:

Statement: My roommate borrowed my sweater without permission.

Comment: If this statement were both true and false at the same time in the same way, it would mean that you simultaneously *gave* your permission and *didn't give* your permission. That is impossible. You must either have given your approval or not given it. This example confirms the principle of contradiction.

Statement: During World War II the Nazis killed millions of Jews in concentration camps.

Comment: Either the Nazis did this horrible deed or they didn't. Since there is no way they did it and didn't do it, this example also supports the principle of contradiction.

Statement: Capital punishment is a deterrent to crime.

Comment: Let's assume for the sake of discussion that capital punishment was once a deterrent to crime but no longer is—in other words, that this statement was true at one time but is false today. Does this situation challenge the principle of contradiction? No. The principle specifies that a statement cannot be both true and false *at the same time* in the same way.

Statement: Edgar is richer than Clem.

Comment: If Edgar has more money than Clem, but Clem surpasses him in moral character or satisfaction, then the statement would be both

[9] See *Buck v. Bell*, 1927.
[10] Stephen Jay Gould, *The Mismeasure of Man* (New York: W. W. Norton, 1981), 335.
[11] Michael D'Antonio, *The State Boys Rebellion* (New York: Simon & Schuster, 2004), 5, 18.

true and false but not *in the same way*. It would be true in one sense and false in another. (To be a contradiction, it would have to say Edgar has more money than Clem *and* does not have more money than Clem.) Thus, this example also confirms the principle of contradiction.

A note of caution: The principle of contradiction applies whenever opposing statements make *exactly opposite* assertions—for example, *she is* versus *she isn't*, *he did* versus *he didn't*, *they have* versus *they haven't*. In such cases, it is certain that one statement must be true and the other false. However, when the assertions made are not exactly opposite but merely different, both could be false. For example, if you say "Sally got the highest mark on the exam" and I say "Luke got the highest mark," it is possible that we are both mistaken. (Bertha or Juwan may have gotten the highest mark.)

Everyone makes mistakes, even experts

It's a shame that there are no official accuracy statistics available for experts in the various fields of knowledge. If there were, you could check the experts' "batting averages." You might be shocked to learn just how often experts are wrong. Bennett Cerf and Victor Navasky have compiled an interesting collection of wrong judgments and predictions made by experts. Many are so far off the mark that they are laughable. Here is a brief sampling:

A British scientist in 1895: "Heavier-than-air flying machines are impossible."

A London professor at the dawn of the railroad, when the top speed was 25 mph: "Rail travel at high speed is not possible because passengers, unable to breathe, would die of asphyxia."

The commissioner of the U.S. Office of Patents, arguing for the abolition of his office in 1899: "Everything that can be invented has been invented."

The President of the British Royal Society in 1900: "X-rays are a hoax."

A banker, in 1903, advising against investing in Ford Motor Co: "The horse is here to stay, but the automobile is only a novelty—a fad."

A famous movie studio head, commenting on the future of TV: "People will soon get tired of staring at a plywood box every night."

Variety magazine's assessment of rock and roll in 1955: "It will be gone by June."

An editor, in 1957, turning down a book on computers: "[I have it] on the highest authority that data processing is a fad and won't last out the year."

This is not to say that the "batting averages" of experts are lower than those of nonexperts. As a rule, they are considerably higher. The most sensible approach is therefore not to settle for a single expert's opinion but to seek a second, and perhaps a third, expert opinion before making up your mind.

In addition, since advanced degrees are not awarded with crystal balls, be especially wary when any expert attempts to predict the future.

Ideas can be examined without being embraced

Some people refuse to consider an idea that differs from their own out of loyalty to their convictions. This refusal is especially strong in political and religious matters.

For example, a conservative might refuse to read an article by a liberal, and a Christian might refuse to listen to a lecture on Judaism, Buddhism, or Islam. Such people prevent themselves from deepening their understanding. In addition, because knowledge is as essential to thinking as air is to breathing, they stifle their intellectual development and do themselves a disservice.

Whenever you are tempted to deny a fair hearing to unfamiliar or opposing ideas, remind yourself that examining an idea is not the same as embracing it. If, after applying critical thinking, you decide that an idea is faulty, you will have a substantial basis for rejecting it. Moreover, you will be in a better position to explain its flaws to others.

Feeling is no substitute for thinking

Following feelings, impulses, and impressions is fashionable today. Some people go so far as to say that feelings are a *better* guide than thoughts. This is a comforting idea, but in order to believe it you have to overlook the many times when feelings have led you astray.

Consider a time when you were trying to lose weight and your feelings said, "Order the double hot fudge sundae." Or another time when you felt the urge to tell your instructor or the boss what you *really* thought of her. Or occasions when you felt the impulse to go to a party instead of studying for a test, charge an expensive item you didn't need and couldn't afford, or drive 30 miles an hour over the speed limit to avoid being late. No doubt you can think of many additional examples of feelings that, if followed, would have caused you pain or misfortune.

Louis L'Amour, vagabond and author of dozens of western novels, tells a story from his days as a laborer in an Oregon lumber mill. The story illustrates the danger of relying on feelings, impulses, and impressions:

> They put a number of us to digging holes four feet square and down to hardpan for concrete piers to support a building soon to be erected. There were at least a dozen of us on the job and the ground was partly frozen. After we got down a short distance, water had to be bailed out, so progress was slow. There was a husky young German, a couple of years older than I, and we got into a contest to make the work more fun. The average was two and a half holes per day, while several were doing three. The German and I were doing four holes apiece.

> Our boss was an easygoing Irishman who saw what was going on and wisely stayed out of it, but the management in its wisdom decided he was not gung-ho enough as a boss and brought in a new man.
>
> Knowing nothing of any of us, he came suddenly into the area and found the German and me leaning on our shovels, having just finished our second holes for the day, while nobody else had finished one. He promptly fired both of us for loafing along with another chap who had been doing three holes a day. In his first day on the job he had fired his three best men. (L'Amour, 105)

The problem with following feelings, urges, and impressions is not that they always lead us astray—they don't—but that they aren't consistently reliable. Sometimes they advise us well, and sometimes they don't. In L'Amour's example, the new boss's mistake was to act on his immediate impression instead of examining it critically.

Rather than mindlessly following your feelings, think about them carefully and decide whether they *deserve* to be followed.

KEY HABITS AND SKILLS OF THINKING

The first step in making the most of your intellectual potential is to strengthen the habits and acquire the skills associated with effective thinking. The sections that follow cover the most fundamental of these habits and skills.

The habit of curiosity

Most children are filled with curiosity. They are constantly asking, "What's that, Mommy?" and "Why, Daddy?" Alas, parents soon tire of such questioning and discourage it, and teachers are too impatient or too busy keeping pace with the curricula to answer. So, many children learn to stifle their curiosity. That is most unfortunate because small and great achievements alike can be traced to curiosity. This is true not only in science and technology but also in the humanities, the social sciences, and business. Virtually every invention has its origin in someone asking "Why is it made (or done) that way?" or "Could there a better way?" And every new insight begins similarly, in someone wondering if things are as they seem or as common opinion holds. The Good Thinking profile of Paul Vitz on page 13 is an example.

The good news is that, though your curiosity may be dormant, it can be revived. All you need to do is be more observant of what people are saying and what is happening around you, ask probing questions, and when time permits seek answers. Before long, you will have made curiosity a habit.

Skill in distinguishing facts from opinions

Facts are ideas whose accuracy is clearly and amply documented and affirmed by knowledgeable people. Opinions are ideas that have not yet been sufficiently documented and are therefore still open to dispute.

Despite the clarity and simplicity of these definitions, the task of distinguishing facts from opinions can be difficult. One reason is that not every *statement* of fact is factual. The most obvious example is a lie—for example, a child saying she didn't eat the cookies when she did, or the perpetrator of a crime swearing he is innocent. In addition to lies, there are honest mistakes. A person might misread a memo and tell a colleague a meeting is scheduled for 3:00 pm today when it is actually scheduled for tomorrow. Or an art expert might declare a painting to be the work of a master and only later discover it is a brilliant forgery. For years it was considered a fact that the earth is flat. (Believe or not, there is still a Flat Earth Society composed of people who cling to this discredited "fact.")

Another reason that facts and opinions can be difficult to distinguish is that opinions are often stated *as if* they were facts. Consider these statements: "The death penalty constitutes cruel and unusual punishment"; "The cause of children committing crimes is irresponsible parenting." Each statement appears to be factual because of the way it is stated. Yet informed people continue to disagree about each. Therefore, each statement is an opinion. (This is not to say that either of these statements is false, only that neither issue has been settled.)

Over time some opinions acquire the status of facts. For example, in the nineteenth century it was standard practice for physicians to handle cadavers in the hospital morgue and then, without washing their hands, make their rounds and visit patients. When one perceptive physician, Ignaz Semmelweiss, expressed the opinion that this practice might be responsible for spreading infections, he was ridiculed and ostracized. Today his "absurd" opinion is universally recognized as a fact.

GOOD THINKING!

The Story of Paul Vitz

Paul C. Vitz is a professor of psychology and the author of many articles and several books, including *Faith of the Fatherless: The Psychology of Atheism*. The story behind this book illustrates how a simple question can lead to new insights.

For much of his life, Vitz had been an atheist, but at age 38 he embraced religion and became interested in the historic tension between psychology

and religion. He learned that "even in intellectual and academic circles, atheism did not become respectable until about 1870 . . . and it continued to be restricted to small numbers of intellectuals into the twentieth century." From his training as a psychologist he also knew that "many atheists are famous for arguing that [religious] believers suffer from illusions, from unconscious and infantile needs, and from other psychological deficits." Freud, for example, argued that belief in God is nothing more than a projection of the believer's desire for security.

As he reflected on these facts, he began to wonder whether this "projection theory" might apply to atheists as well as to believers, or perhaps even apply *better* to atheists than believers. Eager to find out, he decided to study the lives of famous atheists and famous religious believers and see if any interesting patterns emerged. The atheists he chose included Freud, Nietzsche, Hume, and Sartre; the theists included Pascal, Berkeley, de Tocqueville, Kierkegaard, and Buber.

The study revealed that every famous atheist had a weak, dead, or abusive father, and almost every theist had a positive relationship with his father. After analyzing the data, Vitz concluded that the projection theory of religious belief is not only unscientific but also a form of the logical fallacy known as *ad hominem*—in other words, it focuses on the believer personally rather than on the evidence for or against religious belief.

Vitz writes as follows: "Since *both* believers and nonbelievers in God have psychological reasons for their positions, one important conclusion is that in any debate as to the truth of the existence of God, psychology should be irrelevant. A genuine search for evidence supporting, or opposing, the existence of God should be based on the evidence and arguments found in philosophy, theology, science, history, and other relevant disciplines. It should also include an understanding of religious experience."

Paul Vitz's research could pave the way for a more scholarly approach to the study of religion.

For more information on Paul Vitz, see Paul Vitz, *Faith of the Fatherless: The Psychology of Atheism* (Dallas, TX: Spence Publishing Co., 1999).

The following examples illustrate the challenge of separating facts from opinions.

Statement: The 2000 Summer Olympic Games were held in Tokyo.

Comment: This statement has the form of a fact, yet it is not factual. The 2000 Summer Olympic Games were held in Sydney, Australia.

Statement: Camel's hair brushes are made of Siberian squirrel fur.

Comment: The statement appears ridiculous, yet it is factual.

Statement: Stalin was more brutal than Hitler.

Comment: This statement is an opinion, but it is so well supported by historical evidence that many would consider it a fact.

Statement: Eyewitness testimony is generally unreliable.

Comment: Anyone unfamiliar with the relevant research would consider this an opinion, and a wrong one at that. Yet it is a fact.

The following simple guidelines will help you decide whether any statement is a fact or an opinion:

1. **If a statement is common knowledge, it is a fact and need not be supported.**

   Example: Both John and Robert Kennedy were assassinated.

   Example: The cost of a college education is significantly higher today than it was twenty years ago.

   Comment: Both statements are common knowledge, so no support is needed.

2. **If a statement is not common knowledge yet has been confirmed to be accurate, it is a fact and need not be supported. However, the source of the confirmation should be cited.**

   Example: The gray reef shark uses unusual body language to signal that it feels threatened.

   Comment: This fact is not well known, at least among laypeople, so the source should be cited. (It is Bill Curtsinger, "Close Encounters with the Gray Reef Shark," *National Geographic*, January 1995, 45–67.)

3. **If the statement is neither common knowledge nor confirmed to be accurate, it is an opinion and should be supported with evidence—that is, with reliable information.**

   Example: More Americans are victimized by chronic laziness than by workaholism.

   Comment: Some people will disagree, and others may ask, "Why does the author think this? What reasons does he or she have for holding this view rather than some competing view?" The person making the statement should provide answers to such questions.

4. **If it is not clear whether a statement is a fact or an opinion, treat it as an opinion.** In other words, support it with evidence as explained in point #3 above.

Remember another important point about opinion. As used in critical thinking, the term *opinion* refers only to matters of judgment, not to matters of taste or personal preference. The ancient Romans used to say that there is no way to argue profitably or think critically about matters of taste. Their view is as wise today as it was a couple of millennia ago.

Do you favor a slender figure or a full figure? Do you find long or short hair more appealing? Do you prefer fitted jeans or ones with the crotch down around the knees? Do you regard the Lincoln Town Car as beautiful or ugly? Do you enjoy sitcoms more than soap operas? All of these are matters of personal preference or taste that cannot be supported by facts.

As long as you express matters of taste *as matters of taste* you need not defend them, even if others find your tastes odd. Thus, you should say "I prefer long hair" rather than "Long hair is more attractive than short hair," "I prefer the look of the Lincoln Town Car" rather than "The Lincoln Town Car is the most stylish car on the road," and "I enjoy sitcoms more than soap operas" rather than "Sitcoms are superior entertainment."

The habit of checking facts and testing opinions

One reason for checking the facts about an issue is that people sometimes misstate them. Another is that they sometimes *omit* important facts. It doesn't matter whether the misstatement or omission is accidental or on purpose. Either way, if we fail to check, our evaluation may be flawed.

Often you will be able to check the facts of an issue by consulting an appropriate reference book, such as an encyclopedia, an almanac, a newspaper archive, or a dictionary. At other times, you will have to consult the research literature in the field. Chapter 3 includes detailed advice on doing library and Internet research. You may wish to skim those sections now and refer to them whenever you are doing an exercise that calls for research.

The idea of testing opinions may seem odder than checking facts because it has become fashionable to think of opinions as something sacred and above criticism. Many people reason, "I have a right to my opinion—therefore my opinion must be right." They would be shocked to learn that for centuries, opinion was not so highly regarded.

Almost 2,000 years ago the Greek philosopher Epictetus wrote: "Here is the beginning of philosophy: a recognition of the conflicts between men, a search for their cause, *a condemnation of mere opinion* . . . and the discovery of a standard of judgment." [Emphasis added.] Nineteenth-century British author Sir Robert Peel termed public opinion "a compound of folly, weakness, prejudice, wrong feeling, right feeling, obstinacy, and newspaper paragraphs."

American author John Erskine sarcastically termed opinion "that exercise of the human will which helps us to make a decision without information." American philosopher George Santayana observed that "people are usually more firmly convinced that their opinions are precious than that they are true." And one humorist suggested that many opinions that are expressed ought to have been sent by *slow freight* instead.

If you reflect on these skeptical views of opinion, you will appreciate that they underline an important reality—not all opinions are equally sound. Some are wise, others are foolish, and most fall somewhere between the two

extremes. Unfortunately, most of us tend to forget this when forming opinions. Armed with little more than a sketchy news report, an assertion by a celebrity, or a fleeting impression, we may form opinions on complex subjects, such as the causes of child abuse, the reason for dinosaur extinction, or the health benefits of the latest diet.

Some time ago, a roving reporter took his tape recorder into the street and asked passersby, "How serious is racial tension in New York?" Among those who responded were a porter, two teachers, a truck driver, a film editor, a security guard, and a secretary. Chances are that at least some of these people lacked sufficient knowledge to form an opinion, but that didn't stop them from expressing one. (Perhaps they never heard the old saying, "It's better to remain silent and be thought a fool than to express your thoughts and remove all doubt.")

To be a critical thinker, you will need to develop the habit of testing opinions—your own as well as other people's—before trusting them. Here are seven effective ways of doing so.

Consult everyday experience Consider your personal experience as well as what you know to be the experience of other people. If the opinion in question challenges that experience, it is almost certainly mistaken, at least in part. For example, Wayne Dyer, a popular author of self-help books, says that guilt is "not a natural behavior," that it is "useless" and should be "exterminated" (Dyer, 90–91). Yet, experience suggests that most people—particularly kind and considerate ones—feel guilt when they offend others. It's precisely their guilty feelings that motivate them to apologize for their bad behavior and to make amends. Dyer's idea is, at best, an overstatement.

Consider the opinion's likely consequences One way to recognize that an opinion is flawed is to observe that it leads to unintended—and sometimes *undesired*—consequences. Not long ago zealous advocates of African American studies courses expressed the opinion that only African Americans should be allowed to teach such courses. But then Arthur Schlesinger, Jr., a well-known historian, pointed out that such a prohibition would have unintended consequences. He wrote: "The doctrine that only blacks can teach and write black history leads inexorably to the doctrine that blacks can teach and write only black history as well as to inescapable corollaries: Chinese must be restricted to Chinese history, women to women's history, and so on" (Schlesinger, 105).

Suppose you were evaluating this opinion: "The welfare system that continues to drain our tax dollars should not be gradually phased out but ended immediately." Among the consequences you would identify would be (1) some able-bodied welfare recipients would seek work and find it; (2) others would be less successful in their search; (3) those who are too old or too ill to work would be left with no source of income; (4) the living conditions

for some children on welfare would decline; and (5) private agencies such as the Salvation Army would increase their giving. After examining these consequences, you would no doubt conclude that the opinion, as stated, is unreasonable.

Consider the implications This approach entails identifying and examining related ideas suggested by the opinion. Let's say the opinion is "What people view in movies or on television has no effect on their behavior." (Media spokespeople often say this in response to complaints that graphic sex and violence have a negative social impact.)

The implications of this conclusion are that viewing films and television programs cannot degrade, inspire, or motivate us. If this were really the case, then public service announcements to drive only when sober and practice safe sex would be pointless and advertisers would be wasting millions of dollars on them.

Think of exceptions This approach is useful when you are evaluating an opinion that expresses a general rule. The more exceptions you can think of, the more suspect the opinion is. Carl Rogers, a famous psychologist, wrote: "One of the basic things which I was a long time in realizing, and which I am still learning, is that when an activity feels as though it is valuable or worth doing, it is worth doing" (Rogers, 22). To test this idea, think of activities that someone might feel are worth doing but really aren't. Here are just a few: shoplifting, lying on a résumé, and expressing to an instructor your negative assessment of his teaching ability.

Here is another example of thinking of exceptions. A commonly expressed opinion is "If you are strongly motivated, you can be anything you want to be." A notable exception is Michael Jordan's attempt to be a major league baseball player. He certainly did not lack motivation, and his basketball career proved he was a gifted athlete. Despite these advantages, however, he was unable to succeed in baseball. Jordan's case raises questions about the soundness of the opinion.

Think of counterexamples Suppose an author claims that parents should not give children responsibilities until they are in their teens, and supports her view with a number of case histories like this one: "I know a person who was given responsibilities such as picking up his clothes and toys at age 3; taking out the garbage at age 6; and raking leaves, washing dishes, and doing laundry at age 10. Today he's in his mid-thirties and resents having had all those chores." A counterexample would be the case of someone (perhaps you) who had similar responsibilities in childhood and now regards the experience as valuable. The more counterexamples you identify, the more justified you are in wondering about the reasonableness of the author's opinion.

Scholars in every field use the technique of finding counterexamples. Some time ago the issue of repressed memory was in the news. People undergoing therapy suddenly recalled horrible incidents of physical or sexual abuse they had supposedly suffered as children. Some therapists said they were suffering from "traumatic amnesia" and that victims of multiple instances of abuse were more likely to suffer from it than were victims of a single instance. This opinion sounded logical. But at least one critical thinker offered some powerful counterexamples—slaves, survivors of concentration camps in World War II, and victims of torture and political persecution. She noted that all these people suffered intense abuse for years yet never for a moment forgot it (Hagen, 39). These counterexamples did not disprove the idea that memories of abuse can be repressed, but they did suggest the possibility that some claims of repressed memories, though perhaps sincere, are nevertheless false.

Reverse the opinion This test consists of taking the exact opposite of the opinion you are examining and determining if a case can be made for it. Consider the popular opinion "People must feel good about themselves before they are able to achieve." The reverse of that idea would be "People must achieve before they can feel good about themselves." A little investigation will reveal that this is not a new belief but the one that prevailed for hundreds, even thousands, of years before the self-esteem movement became dominant. To decide which of the two opinions is more reasonable, you might consider ordinary achievements in your own life—such as learning how to tie your shoes, whistle, ride a bike, dribble a basketball, drive a car, surf, or use a computer—and then decide whether self-esteem preceded or followed the achievement.

Look for relevant research Every subject from agriculture to zoology has its devoted students, individuals who have spent decades learning everything they can about it and sharing their knowledge with others. These individuals are as near as the library or the Internet. One of the best ways to test any opinion is to see what these knowledgeable people have to say about it. (Chapter 3 explains how to conduct research. If you wish, you may look ahead and read that explanation now.)

THE NEED FOR A SYSTEMATIC APPROACH

Chapter 2 will present a step-by-step approach to thinking. But before doing that, it may be helpful to demonstrate the value of such an approach. The easiest way to do that is in the context of an actual situation. The situation we will use is the growing concern over mass murder in the United States.

Between 1982 and 2012, there were 62 mass murders in the United States with a combined loss of almost 1,000 lives. Among the most notable

incidents were those in Tucson, Arizona; Fort Hood, Texas; Blacksburg, Virginia; Columbine and Aurora, Colorado; and Newtown, Connecticut. The Newtown incident was especially troubling because the great majority of the 26 victims were little children.

Concerned individuals and groups naturally wondered how such wanton violence could be ended. The editors of the White Plains (New York) *Journal News* decided that a partial solution would be to publicize information on gun ownership. Taking advantage of the Freedom of Information Act (FOIA), they searched public records for the names and addresses of legal gun owners in two local counties and published their findings—33,614 in all—with an interactive map.

The newspaper's action immediately triggered strong reactions. The county clerk of a third county refused to provide the gun ownership information to the newspaper, claiming it would create a danger for law-abiding citizens. New York State Senator Greg Ball agreed, and went so far as to call the editors "asinine." Commentators from around the country offered a variety of criticisms of the *Journal News*. Many pointed out that criminals could use the information on gun ownership to plan their robberies, entering the homes of gun owners while they are away and stealing their guns, or targeting the homes of people not on the list because, without guns, they would be more vulnerable.

Publishing the list had a number of unintended consequences. Prison guards reported receiving threats from inmates saying "we now know where you and your family live." A woman who had previously been stalked for years started receiving disturbing phone calls again. A battered wife who had left her husband and started a new life was terrified that her published address would enable him to find her. Retired judges and police officers became fearful that criminals they had dealt with over the years would use the published information to find them and exact revenge.

Perhaps the most ironic unintended consequence concerned the editors of the *Journal News* themselves. Their own personal information was posted on line. They and their staffs received threatening phone calls, some so serious they were forced to hire armed guards for protection. Gun owners and their supporters published a list of the newspaper's advertisers and urged people to boycott them.

A number of critics found it odd that the *Journal News* focused its investigation on law-abiding individuals rather than, for example, convicted sexual predators or people who didn't pay child support. And virtually all of the critics agreed not only that the publication of gun ownership information was a violation of the privacy of legal gun owners and that it produced a number of unfortunate consequences, but also that it contributed nothing to solving the problem of gun violence in general or the Newtown, Connecticut, shootings in particular.

This *Journal News* case is a classic case of poor thinking. The editors intended to be helpful and to solve a problem, but in fact they did the opposite. The saddest fact is that all the difficulties could have been avoided if they had approached the issue more thoughtfully—for example, if they had taken the time to wonder whether factors other than legal gun ownership might be contributing to the epidemic of mass shootings in America and, if so, whether those factors might be more important and more newsworthy than the names and addresses of legal gun owners.

This case of deficient thinking may be more obvious and dramatic than most, but it is certainly not an isolated example. Other examples could be cited in school, at work, and in personal lives. The best way to avoid thinking lapses in all these areas is to adopt a systematic approach to thinking. Chapter 2 will introduce such an approach.

EXERCISES

1.1. Throughout this century, a famous painting entitled *The Man with the Golden Helmet* was believed to be the work of the Dutch master Rembrandt. Some years ago it was proved to have been painted by someone else. Some people would say that the truth about this painting changed. Do you agree? Explain.

1.2. Examine each of the following cases in light of what you've learned about truth in this chapter. State your view and explain why you hold it.

a) Ira is a journalist. Will the belief that he can create his own truth make him more or less likely to value accuracy in his reporting?

b) Bruce is prejudiced against minorities and women. Which of the following beliefs would be more helpful in overcoming his prejudice: the belief that truth is subjective and created or the belief that truth is objective and discovered? Explain your reasoning.

c) Most students can use additional motivation to learn. Will the belief that they can create their own truth help or hinder their motivation? Explain.

1.3. Classify each of the following exchanges as (a) an actual contradiction or (b) a near contradiction. Briefly explain each choice.

MAVIS: *Big time college sports are corrupt.*

CORA: *You're absolutely wrong, Mavis.*

KAREN: *There are very few real heroes today.*

HANNA: *I think there are more today than there have ever been.*

BRAD: *Look at that new Lincoln across the street.*

CLARA: *That isn't a Lincoln—it's a Mercury.*

1.4. Indicate whether each of the following statements is

a) clearly a fact.

b) possibly a fact, but not clear without documentation.

c) an opinion.

d) a personal preference expressed as a personal preference.

e) a personal preference incorrectly expressed as an opinion.

Remember that it is sometimes difficult to separate facts and opinions. There may be room for disagreement over some answers, so be prepared to explain your choices.

1. I find blue-eyed redheads appealing.
2. The Chevrolet Camaro is the most stylish car on the market.
3. All religions share the same fundamental truths.
4. Darwin's theory of evolution continues to be controversial.
5. Pornography is an insult to women.
6. Black people are the victims of crime more often than white people.
7. Prostitution should be legalized.
8. People who need organ transplants greatly outnumber organ donors.
9. The publicity given to suicides leads to most "copycat" suicide attempts.
10. Comic books are as instructive about life as novels are.
11. Most students who drop out of school lack the intelligence to succeed.
12. Surgical procedures have been performed on fetuses while they were still in the uterus.

1.5. Now take the statements in the previous exercise and do as follows:

- For each that you classified as (b), possibly a fact, state one or more reliable sources that could be cited to support the statement (assuming that the statement is factual).
- For each that you classified as (b), write questions that might be raised about the statement.
- If you classified any statement as (e), rewrite it as a personal preference rather than as an opinion.

1.6. Evaluate these opinions applying the lessons you learned in this chapter.

A famous movie actress explained why she nursed her daughter for two years: "That's a particular philosophy I have . . . allowing her to make her own decisions. I feel she is a better judge than I am."

Line from a bumper sticker: "Guns don't kill people; people kill people."

A New Age author tells his readers: "You are the only thing that is real. Everything else is your imagination."

1.7. State an opinion you have heard expressed (or expressed yourself) about a current local, national, or international issue and evaluate it as you did the statements in Exercise 1.6.

1.8. In each of the following cases, decide whether the reason offered is both good and sufficient to support the opinion or action. Explain your decision.

"Your Honor, I believe I was justified in hitting my wife. She kept nagging me about getting a job."

"I didn't sign that petition. The person who asked me to sign refused to support my proposal last year."

"I oppose government funding for abortions. It requires taxpayers to finance a procedure that many of them believe is a moral outrage."

Students who are caught cheating should receive a failing grade in the course. Cheating is a serious violation of scholarly integrity.

Women should not take their husbands' names when they marry. Doing so is a sign of subjugation.

1.9. What lessons can you draw from the "good thinking" profiles of Albert Einstein, Nellie Bly, and Paul Vitz presented in this chapter? Explain how you can use each of those lessons in your career or personal life.

1.10. Describe an occasion on which you or someone you know acted without thinking through the matter sufficiently. Explain what happened as a result of this failure. What could you done in the thinking stage to anticipate and avoid what happened?

QUIZ

1. Define the term *intelligence*.
2. Name the three broad dimensions of thinking.
3. Thinking can be taught but only to gifted students. True or false?
4. Every idea is distinct from all others and its meaning is unrelated to theirs. True or false?
5. Explain the error in this statement: "I create my own truth. What I believe to be true is true for me."
6. State the principle of contradiction. Then explain how this principle aids us in critical thinking.
7. Respond to this statement: "I have a right to my opinion, so you have no business challenging it."
8. Is it useful to argue about matters of taste? Explain.
9. Feeling is no substitute for thinking. True or false?
10. One effective way to test opinions is to consult your personal experience. True or false?

Answers to this quiz are available at www.cengagebrain.com.

The W.I.S.E. Approach to Thinking[1]

2

IN THIS CHAPTER

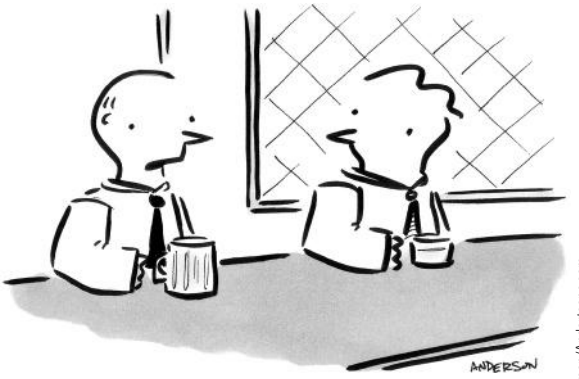
▶ Introducing the W.I.S.E. approach	*The acronym stands for Wonder, Investigate, Speculate, Evaluate.*
▶ Examples of problem solving	*These cases show how W.I.S.E. is used with problems.*
▶ Examples of issue resolution	*These cases show how W.I.S.E. is used with issues.*
▶ An important relationship	*Often issues are identified while solving problems, and problems while resolving issues.*
▶ A caution about bias	*Be alert for three forms of bias in your thinking.*

Scholars and practitioners of critical thinking agree that knowing the principles, habits, and skills of thinking is just the first step in becoming a critical thinker. The next step is to put this knowledge into practice. For that, you will need a strategy or approach to guide your efforts. Numerous strategies have been developed in various fields of study. Examples include "The Scientific Method," "A Sociological Heuristic," "The Process of Invention," and the "Creative Problem Solving Process."[2] Three of these strategies have seven steps, one has eight.

Having to learn a different strategy for each subject area is impractical and can be confusing. Fortunately, it is not necessary to do so. All such strategies are remarkably similar in the thinking processes they specify and even in the arrangement of steps. The strategy you will learn in this chapter is

[1] The W.I.S.E. approach is Copyright © 2002, 2010 by Vincent Ryan Ruggiero. The term itself and the explication presented in this chapter are used with permission.

[2] For explanations of these approaches, see, respectively: *Wikipedia*, the Free Encyclopedia, http://en.wikipedia.org/wiki/Scientific_method; James M. Henslin, *Sociology: A Down-to-Earth Approach*, 7th ed. (New York: Pearson, 2005), 144; Joseph Rossman, *The Psychology of the Inventor* (Washington, DC: The Inventor's Publishing Co., 1931), 57; Alex Osborn, *Applied Imagination* (New York: Scribner's Sons, 1957), 115.



"Every time I start to see the light, the bulb burns out."

Mark Anderson/Andertoons.com

simpler and easier to remember than most, and it can be used for challenges in every field of study.

INTRODUCING THE W.I.S.E. APPROACH

The W.I.S.E. approach to thinking incorporates all three kinds of thinking—reflective, creative, and critical. It consists of four steps:

Wonder This step entails reflecting on our experiences and observations and identifying challenges that are worth addressing. Unlike the other steps, this one does not begin or end with particular challenges but is ongoing.

Investigate This step consists of gaining information about the challenges identified by wondering. It helps us gain the information and reach the understanding needed to solve problems and resolve issues.

Speculate This step consists of identifying possible solutions to problems and possible resolutions of issues.

Evaluate This step consists of testing the possible solutions to problems or the various arguments about issues and deciding which one(s) are most worthy.

Let's look more closely at each of these steps and consider how to master them.

GOOD THINKING!

The Story of Frank and Lillian Gilbreth

This remarkable husband and wife team, both of whom were born in 1868, became pioneers in the science of time management. As a young apprentice, Frank studied master bricklayers and noted that they all used different motions. He also noted that each of their assistants had an individual way of placing the bricks and mortar; some did less bending, reaching, and lifting than others and were more efficient.

Gilbreth realized that having all the workers imitate the more efficient ones would result in a considerable cost saving. He wondered how he could achieve maximum efficiency and, after considering various changes, decided to fit each scaffold with a shelf for the bricks and mortar and a convenient stacking system. Ultimately his changes reduced the number of motions required to lay a brick from 18 to 4 1/2. Gilbreth then became a building contractor and, later, a management engineer.

Eventually, Frank met and married Lillian, who had studied literature but then obtained a Ph.D. in industrial psychology. Both lectured at Purdue University and worked as management consultants, helping a wide variety of workers, including surgeons, save time, improve performance, and reduce fatigue. Their basic approach was to film workers at their jobs and then conduct exacting motion studies to determine optimum motion patterns.

Frank Gilbreth died in 1924. After his death, Lillian continued to use their approach to help injured individuals become productive despite their handicaps and to improve household efficiency. She died in 1972.

This amazing couple made all their contributions while raising twelve children. Their best-selling book, *Cheaper by the Dozen*, was made into a classic movie that is still shown from time to time on TV. A more recent version of their story starred Steve Martin.

For more information on the Gilbreths, see http://gilbrethnetwork.tripod.com/bio.html.

Step 1: Wonder

Almost 2,500 years ago, Socrates noted that wonder is the beginning of wisdom. What inspires wonder? One inspiration is a desire to improve things. In the early days of the railroad, tracks were made with a flange (lip) so that the trains would not fall off. Millions of tons of steel were required to make

that flange. Years later, someone wondered whether there was a less expensive way of keeping cars on the tracks and eventually thought of putting flanges on the trains' *wheels* instead of the tracks. That approach has been standard ever since.[3]

An even greater spur to wonder is negative experience. For Levi Strauss the experience was *failure*. During the California Gold Rush in the mid-nineteenth century, Levi Strauss received a shipment of heavy cloth and attempted, unsuccessfully, to sell it as material for tents. He wondered how he might use all that cloth and eventually invented Levi jeans.

For Robert Kearns, the experience was *frustration*. Bothered that the slowest setting on his wipers was still too fast, requiring him to listen to the thump-thump even in light drizzle, he wondered how the annoyance might be overcome and in time invented the variable speed wiper.

For businessman Frank McNamara, the experience was *embarrassment*. One day in 1949, he was having lunch in an expensive restaurant with some friends. When he went to pay, he discovered that he had left his wallet at home and needed to call his wife and ask her to bring it to him. After wondering how to avoid such situations in the future, he invented the credit card.

One of the strongest motivations to wonder is *controversy*. Every dispute is a challenge to find the most informed and reasonable view. There are local controversies such as campus parking and grading policies, international controversies such as trade embargos, and national controversies, including health care legislation, illegal immigration, medical marijuana, the auto company bailout, Social Security privatization, vaccines for children, and the drinking age, to name but a few.

Stay alert for events or situations that you find frustrating or annoying, and listen to what people complain about in conversation. Then, instead of grumbling, wonder about how the situations can be improved. Also be alert for issues that people disagree about and recognize them as opportunities to gain new insights.

Step 2: Investigate

Investigation aims to satisfy the curiosity expressed in wondering. The focus of investigation is slightly different for problems than for issues because problems are seldom controversial,[4] whereas issues are always controversial.

Problems In investigating a problem, the aim is to understand (1) how the process in question works or how the implementation is designed;

[3] George Iles, *Inventors at Work* (New York: Doubleday & Page, 1906), 370.
[4] Of course, specific proposals for *solving* problems can be controversial.

(2) why people are dissatisfied with the process or the implementation—for example, a process may be too time-consuming or an implementation may not work as intended; (3) and why previous attempts to solve the problem, if any, failed.

Issues In investigating an issue, there are two aims. The first is to acquire the evidence necessary for you to form a judgment (see Step 4). Following are the most common kinds of evidence, with a comment on the comparative reliability of each.

Anecdotes. Perhaps the most common form of evidence, anecdotes are brief or extended accounts of something that happened. If verified, they can be valuable, but tracing their origin and verifying them can be difficult. (Anecdotes often prove to be empty rumors or hoaxes.)

Eyewitness testimony. Eyewitness testimony is a report of what someone observed firsthand. Such testimony is popularly regarded as highly reliable. After all, there is something persuasive about a seemingly honest person who says "I saw it happen" and goes on to provide the details of who, how, and where. However, research has shown that eyewitness testimony is sometimes false. Preconceived notions can distort perception, and the memory of an earlier event can be corrupted by subsequent events. Therefore, eyewitness testimony varies in reliability.

Laboratory or field experiments. Laboratory experiments are performed under controlled circumstances; field experiments take place in natural surroundings. For example, one might observe a group of children at play, participants at a political convention, or Amish farmers raising a barn. For the results of the observation to be reliable, the observer must not have influenced the behavior of the group. Also, the period of observation must have been of reasonable duration. Both kinds of experiment are reliable if replicated—that is, duplicated by one or more independent sources.

Statistical studies. Statistics usually refers to quantitative information obtained about every individual in a group or category. Examples of statistics are the percentage of deaths caused by drunken driving, the comparative college admissions scores of various racial and ethnic groups, and the voting records of members of Congress. If the statistical sources are reputable, the statistics are generally highly reliable. But it is prudent to check that they are quoted accurately.

Surveys and opinion polls. This type of information is a subdivision of statistics. However, it is obtained in a special way—by a sampling of the group. The sample may be random or systematic (e.g., every 50th name

in the phone book). It may also be done in person, by telephone, by post, or by email. Such sampling is generally highly reliable if these conditions are met: All members of the group must have an equal chance of being contacted, and the questions must be clear, unambiguous, and unbiased. Keep in mind that the way survey questions are phrased can influence the responses. (Caution: Surveys measure only how many people hold a viewpoint, not whether the viewpoint is correct.)

Expert opinion. This kind of testimony has the advantage of being grounded in extensive knowledge of the subject and understanding of what is typical in most cases. This kind of evidence can be highly reliable, especially if the opinion is shared by most experts. (Remember, though, that experts are human and can be mistaken even when they agree.)

Research reviews. Research reviews examine the general body of research information on a topic. It is not uncommon for such a review to cover dozens, even hundreds, of independent research studies. When research reviews do not omit any significant studies, they are among the most highly reliable types of evidence.

The second aim of investigation is to identify the conflicting arguments about the issue. An argument is defined as a rationale or line of reasoning consisting or two or more assertions[5] that are offered as true, plus a conclusion that purportedly follows logically from them. When members of Congress disagree over a piece of legislation, they offer conflicting arguments. So do prosecution and defense attorneys when they make their summations to the jury, and scholars when they engage in formal debate. Arguments can vary in length from a single sentence to a brief essay or even to a 400-page book. Complex arguments contain a network of assertions.

As you examine the arguments people present on an issue, you will encounter the evidence they believe supports their assertions. (The types of evidence will be the same as those listed previously.) Responsible individuals will offer significant, and often substantial, evidence. Irresponsible individuals will offer little or no evidence, sometimes because of carelessness, and sometimes because they mistakenly believe that their ideas deserve to be accepted on their own say-so.

The more thorough your investigation, the more prepared you will be for the next step, speculation. Remember that the purpose of investigation is to *understand* and not to judge. Judgment is a separate step and comes later. (Note: The next chapter explains how to conduct investigations. Feel free to look ahead to that chapter if you have any questions.)

[5]Logicians call such assertions *premises.*

GOOD THINKING!

The Story of Elizabeth Loftus

The majority of men and women engaged in scholarly research are not invited to the talk shows or written about in popular magazines, even when their work has a significant effect on people's lives. Psychologist Elizabeth Loftus is an exception. One reason is that her research has challenged some longstanding beliefs about human memory. Another is the relevance of that research to some prominent controversies of the last decade or two.

The traditional view is that memory is like a videotaped record of events etched into the grooves of our minds. According to this theory, a particular record may become hidden, even from ourselves, but it is never lost. Given our desire and, in some cases, the assistance of people experienced in recovering such "data," we can recover any memory, however traumatic. And what we recover will be accurate to the smallest detail.

A number of researchers have challenged this traditional view of memory, but none as effectively as Loftus. She devised her own research projects and proved that real memories can be altered, and that fictitious memories can be created. In experiments with children and adults, she first showed them short films and later discussed their recollections of what they saw. In one experiment, by merely asking "Did you see a bear?" or "Did you see a boat?" she was able to make them remember details that were not present in the film.

In another case, by using the word "smash" instead of "hit" she was able to change people's estimate of the speed of cars *and* to create a memory of broken glass where there had been none.

For more information on Elizabeth Loftus, see Elizabeth Loftus and Katherine Ketcham, *Witness for the Defense* (New York: St. Martin's Press, 1991) or Elizabeth Loftus, *Eyewitness Testimony* (Cambridge, MA: Harvard University Press, 1996).

Step 3: Speculate

The aim of this step is to consider, in light of your investigation, various responses to the problem or issue. Because of the difference between problems and issues, we will discuss each separately.

Problems With problems, speculation aims at identifying a broad range of possible solutions. Begin by asking a variety of "How can . . . ?" questions. (These questions are recommended because, unlike others, they

point to solutions.) Take, for example, the problem of communicating with people over distances. During America's westward expansion, the problem was expressed, "How can we expedite mail delivery to the West Coast?" That question led to development of the Pony Express. Another question, "How can we communicate messages without transporting them?" led to an even better solution—the invention of the telegraph. Slightly different "How can . . . ?" questions led to other communications innovations, including the typewriter, the telephone, the computer, and the Internet.

Consider, too, the problem hotels had with long checkout lines during peak morning hours. Managers asked, "How can we handle the long lines at the checkout desk more efficiently?" and thought of adding clerks and posting "Be sure to allow time for checkout" reminders in guests' rooms. But only when managers dared to ask the seemingly outrageous question "How can we eliminate the formal checkout procedure altogether?" did they think of placing the final bill under the door on the day of checkout and offering instant video display of guests' accounts on the TV screen.

When the massive oil spill occurred in the Gulf of Mexico in early 2010, the questions asked included "How can the break in the pipe be sealed?" "How can the spilled oil be captured?" "How can the oil be prevented from reaching the coastal areas?" "How can animals caught in the oil be saved?" and "How can people whose businesses have been harmed by the spill be compensated?"

Notice that each "How can . . . ?" question in the previous paragraphs opened a different avenue of thought and thus led to a different kind of solution. So, be sure to ask many different "How can . . . ?" questions. The key to doing so is to choose your verbs carefully. For example, if the problem concerns a process (such as registering for classes), you might ask "How can we *simplify* the process?" "How can we *speed up* the process?" and "How can we *shorten* delays in the process?" For other types of problems, you might choose verbs such as *combine*, *reduce*, *eliminate*, *repair*, *streamline*, or *enhance*.

After you have expressed the problem in a number of "How can . . . ?" questions, think of as many possible answers as you can for each question. The first answers you think of are likely to be common and predictable, but if you persevere, you will produce some uncommon and therefore more interesting possibilities. As people familiar with the technique of brainstorming will tell you, it is best to separate this idea *production* from idea *evaluation* (Step 4 of the W.I.S.E. process). The reason is that stopping to evaluate each idea breaks the flow of thought and necessitates beginning again. Also, be sure to devote sufficient time to idea production. The more possible solutions you consider, the better your chances of producing a satisfactory, or even a great, one. Skimping on idea production will lessen your chances of solving the problem.

Issues With issues, speculation aims at considering possible resolutions of the controversy. (These possibilities will be compared and narrowed down in the final stage, evaluation.) First, summarize the arguments on both sides of the issue, as revealed in your investigation. Keep in mind that there may be a number of different arguments for both the pro and the con side of an issue. In some cases you may be able to think of new arguments that you did not encounter in your investigation; summarize these too. Include in each summary the main assertions and the conclusion.

Next, turn all the conflicting assertions and conclusions into questions, using words like "Is?" "Does?" "Could? "Should?" and "Would?" The advantage of this approach is that it forces you to analyze every assertion and not simply *assume* that the ones you are most familiar with are correct. (This assumption, common among careless thinkers, is a serious obstacle to critical thinking.)

The simplest way to perform these steps is by dividing a sheet of paper into three columns. Figure 2.1 illustrates this approach with three examples, each from a different issue.

Step 4: Evaluate

The aim of this step is to decide on the best solution to the problem or resolution of the issue.

Problems For problems, review all the possible solutions you produced in response to your "How can . . . ?" questions and decide which is the *best* solution. For example, for the problem of the Gulf oil spill, there were many possible solutions offered for *each* of the main questions—"How can the break in the pipe be sealed?" "How can the spilled oil be captured?" "How can the oil be prevented from reaching the coastal areas?" "How can animals caught in the oil be saved?" and "How can people whose businesses have been harmed by the spill be compensated?"

Next, test the possible solutions against the relevant criteria and decide which solution is best. Here is a comprehensive list of criteria helpful in finding solutions to problems. (Some may not apply to the particular problem you are addressing.) After considering the relevant criteria, decide which of your possible solutions best fits them.

Comprehensiveness. Will any of these solutions solve the entire problem? If not, which one will solve most of it?

Longevity. Which solution is likely to last the longest? In the case of products, the kind of materials and their design will be relevant.

Practicality. Which solution is the most workable? Simplest? Least confusing? In the case of a product, how simple or complex will its function be? In the case of a process, how many steps will be required to perform it?

Safety. Which solution is safest—in other words, which poses the least risk to those involved in its implementation?

Efficiency. Which solution requires the least time and effort to implement? For example, which involves the fewest steps and the fewest people to implement it?

Economy. Which solution costs the least? Both the initial cost and the continuing cost should be considered. Sometimes the initial cost—say, for training of staff—may be low, but the continuing cost—say for salaries and utilities—may be prohibitively high.

Compatibility. Which solution is most compatible with existing approaches and procedures?

Appearance. If the solution is something that will be seen—for example, a product—does it have aesthetic appeal?

Morale. Which solution will have the most positive (or least negative) effect on the people involved in implementing it?

Legality and morality. Which solution is most consistent with existing legal obligations and moral requirements—for example, to people and the environment.

Issues For issues, your goal is to find the most defensible point of view. To do this you must decide which assertions are true, and which conclusion flows logically from those assertions. The most defensible view may be exactly what someone has already expressed, or a different view that you construct from the insights on both sides of the issue.

Begin by addressing each of the questions you raised about the various arguments (as illustrated in Figure 2.1). In the case of an assertion, check the kind and quality of the evidence that was offered in support, or that you discovered.

For **anecdotes**, consider: Is the author's presentation of the anecdote or case faithful to the facts? If so, are the experiences described typical or untypical? How plausible are they? Are they verifiable?

For **eyewitness testimony**, consider: Does the person have anything to gain by misrepresenting the facts? Were the conditions favorable to observation—for example, did the event occur in the day or at night, in good weather or bad? Did the event occur slowly or quickly? Was the person in a state of mind conducive to accurate observation? Could the person's memory have been confused by something that occurred after the event but before the testimony was given?

For a **laboratory experiment**, consider: Have the findings of the experiment been confirmed by other, independent researchers?

For **a field experiment**, consider: Did the presence of the investigator influence the outcome?

FIGURE 2.1

Sample Arguments	Counterarguments	Relevant Questions
Issue 1: Self-esteem is essential to learning. High self-esteem increases academic achievement; low self-esteem decreases academic achievement. Certain educational practices tend to lower self-esteem—for example, criticizing students' thought and expression on essay questions and withholding credit for wrong answers on math questions. Therefore, such practices should be abandoned.	**Issue 1:** Self-esteem is not essential to learning. The level of self-esteem, whether high or low, has no significant effect on academic achievement. Practices such as criticizing students' thought and expression on essay questions and withholding credit for wrong answers on math questions help students correct their mistakes and learn. Therefore, such practices should be encouraged.	**Issue 1:** Is self-esteem essential to learning? Does high self-esteem increase achievement? Does low self-esteem decrease it? Do criticism of essay answers and losing credit for wrong answers lower self-esteem? Are such practices harmful or helpful? Should they be abandoned or encouraged?
Issue 2: Spanking is a form of violence. Its consequences are always negative. It teaches children that aggression is a legitimate response and that might makes right. Anyone who is spanked in childhood is more likely than others to be an abusive spouse and parent in adulthood. Therefore, parents who spank their children are guilty of child abuse and should be so charged.	**Issue 2:** Spanking is not a form of violence. If done without anger when children are young, it can have a positive influence. It teaches that actions have consequences and that we must take responsibility for what we say and do. Children who are spanked in a context of love and caring are likely to be more respectful of rules and others' rights in adulthood. Their parents deserve our appreciation.	**Issue 2:** Is spanking a form of violence? Are its consequences positive or negative? Do the circumstances matter? Does it teach children that aggression is legitimate and might makes right or that they are responsible for their behavior? Are those who are spanked more likely to be better or worse in adulthood for the experience? Is spanking equivalent to child abuse? Should it be discouraged or encouraged?
Issue 3: In all forms of athletic competition, injuries can occur. But in boxing alone, injuring the opponent is the very purpose of the contest. Furthermore, no amount of training and no protective gear can control the risk of serious injury. Therefore, boxing is not a sport but a form of brutality, and it should be outlawed.	**Issue 3:** Boxing is one of the most ancient forms of athletic competition. Like other forms, it demands coordination, quick reflexes, and high levels of strategy. Before boxers are permitted to compete, they must undergo rigorous training and be cleared by medical doctors. To outlaw boxing would be a disservice to the many poor people for whom it has provided a livelihood.	**Issue 3:** Is boxing an ancient form of competition? Does it demand coordination, quick reflexes, and high levels of strategy? Are boxers rigorously trained and examined medically? Do more injuries occur in boxing than in other competitions? Is injuring one's opponent the boxer's aim? Do training and gear offer sufficient protection? Is boxing properly classified as a sport? Would outlawing boxing be a disservice to the poor? Should boxing be outlawed?

For **statistical evidence**, consider: Is the source of the data reliable? How long ago were the statistics compiled? Have conditions changed since then?

For a **survey** or **opinion poll**, consider: Was the sample representative of the larger group? Were the questions clear and objective? For mail surveys, did too few people respond for the survey results to be trusted?

For **expert opinion**, consider: Does the person have specific expertise in the subject in question? (It is not uncommon these days for experts to offer opinions far outside their areas of expertise.) Does the expert's view represent the majority or minority view among experts in the field? In other words, do other experts agree with the person in question?

For a **research review**, consider: Were any important studies omitted?

When the evidence supporting an assertion is both sufficient and credible, you should accept it. (It is not uncommon to find that each side of the dispute has some correct and some mistaken assertions.) When you have finished checking all the assertions and identified those that are true to the facts, your final step is to determine what conclusion they best support—in other words, the most worthy viewpoint on the issue.

If at this point the W.I.S.E. approach seems formidable, it is only because of the explanatory material necessary to introduce it and answer the most obvious questions. As with any other new process, once you become familiar with it, you will appreciate how easy it is to use.

EXAMPLES OF PROBLEM SOLVING

Any number of examples could be offered to show the relevance of the W.I.S.E. approach to problem solving, but space limitations permit only two.[6]

The uncooperative page markers

Art Fry was a chemical engineer employed in the product development department of 3M Corporation. However, his best-known breakthrough idea didn't occur in the workplace but in his church choir.

Fry enjoyed singing in his church's choir and, like members of choirs everywhere, was in the habit of marking the scheduled hymns with little

[6] I am not suggesting that the individuals in the problem and issue examples *consciously employed* the W.I.S.E. approach. (How could they have? It was developed after the achievements noted here.) I am saying, rather, that their cases *exemplify its relevance* to real life challenges.

pieces of paper. This way he could turn to the appropriate hymn quickly and be ready to sing when the choirmaster gave the signal. Unfortunately, the little pieces of paper had a way of falling out, leaving him to hurriedly flip through the pages searching for the correct hymn.

Fry wondered how he could get the slips of paper to stick to the page so that they wouldn't fall out but could be easily removed when he was through with them. He remembered a peculiar adhesive a fellow researcher had concocted a few years earlier. At that time no one had been able to think of a use for it.

Fry checked the files, got the formula, and made a batch of adhesive. It turned out to be too strong for his purposes. So he experimented with the formula and finally produced a glue that was like the little bear's porridge in the Goldilocks story—not too strong, not too weak, but just right. He took the idea to management and got approval to test-market the sample product, and the "Post-it®" was born.

The librarian's lament

Imagine how difficult it would be to use a library if there were no system for shelving the books. If you wanted a particular book, you'd have no idea how to find it. It might be on the top shelf of aisle #1, the bottom shelf of aisle #40, or anywhere in between. The larger the library, the more difficult it would be to use. A large university library would be virtually *impossible* to use.

The situation was never quite that bad, but up until 1876 the system in use was inflexible and cumbersome. Each book had a designated place on the library shelves. A book on astronomy might be between a book on woodworking and another on medieval architecture. To make matters worse, each library had its own system.

Melvil Dewey, a student assistant in the Amherst College library, lamented the difficulty of reshelving books. He wondered if there were a better way, and set out to devise one. His investigation and experimentation led to the system known as the Dewey decimal system.

The Dewey system has ten main divisions: 000 is Computers, information, and general reference; 100, Philosophy and psychology; 200, Religion; 300, Social sciences; 400, Language; 500, Science; 600, Technology; 700, Arts and recreation; 800, Literature; 900 History and geography. Each division has a series of subdivisions. Dewey's system made the library much easier to use. Today Dewey's system is used in more than 135 countries and has been translated into more than 30 languages. It is also proving useful in classifying Internet resources.[7]

[7] For more information on Melvil Dewey, see www.oclc.org/dewey/resources/biography.

EXAMPLES OF ISSUE RESOLUTION

Is venting anger healthy?

For centuries, the prevailing view was that, though it can sometimes be appropriate to express anger, as an everyday rule it is better to suppress it. But in the 1960s and 1970s a dramatically different view became popular among many psychologists and the general public—the view that suppressing anger is emotionally unhealthy. "Express your anger," the experts said, "and it will dissipate, and with it a lot of harmful tension, stress, and even neurosis."

Carol Tavris, a psychologist, wondered about this issue: Was the centuries old view, with its emphasis on restraint, really so mistaken? Are people who control their urges and treat others with civility really in danger of becoming neurotic?

She set out to answer these and related questions by conducting her own observational studies and by consulting others' research into anger and its effects. She noticed that people expressing anger seem to grow angrier, not calmer. Moreover, research confirmed her observation and proved that "talking out an emotion doesn't reduce it, [but instead] . . . rehearses it." The research also established that overexpressed anger is more likely to contribute to disease, in particular heart disease, than is suppressed anger.

In reviewing her considerable research, Tavris concluded that the belief that expressing anger promotes health is a combination of misunderstanding, oversimplification, and myth. The appropriate use of anger, she decided, "requires an awareness of choice and an embrace of reason. It is knowing when to become angry. . . and when to make peace; when to take action and when to keep silent. . . ."[8]

What causes yellow fever?

By 1900 the United States had suffered 90 epidemics of yellow fever. One in 1793 killed 10 percent of the population of Philadelphia. Napoleon reportedly sold the Louisiana Territory to the United States because the disease claimed 90 percent of the forces he had stationed there. The disease began with chills and a headache, then progressed to severe pain, high fever, and vomiting. Next came jaundice, followed in extreme cases by internal bleeding and death.

For a long time medical experts disagreed about the cause of the disease. Some said it was bacterial; others thought it was transmitted by insects. In time the former view prevailed, but outbreaks of the disease continued. Walter Reed, a young army surgeon who was also trained in bacteriology and pathology, noted that one member of a family would be stricken while

[8] For more information on this issue, see Carol Tavris, *Anger: The Misunderstood Emotion* (New York: Simon & Schuster, 1982).

others were not. Noting that the disease was neither contagious nor airborne, he wondered if the older, discredited view might be correct.

Reed's investigation took the form of an ingenious experiment. He had one group of army volunteers sleep on the clothing and beds of yellow fever patients in a screened room (to keep mosquitoes out). No one in this group became infected. Meanwhile, he kept another group completely apart from infected people and their belongings. But this group he exposed to mosquitoes that had been in the rooms of infected people. These volunteers became infected.

Having proved how yellow fever was transmitted, Reed had the army install mosquito nets and wipe out mosquito breeding grounds in and around Havana. These efforts were so successful in ending the scourge that the same approach was used in Panama, thus removing a major obstacle to the construction of the Panama Canal.

Walter Reed was awarded the Congressional Medal of Honor for his contribution to the eradication of yellow fever. He also became the first physician to be elected to the Hall of Fame of Great Americans at New York University. The Walter Reed Army Medical Center in Washington DC is named after him.[9]

AN IMPORTANT RELATIONSHIP

Because of the differences in dealing with problems and issues, we have separated them. But it is important to understand that we often find problems while dealing with issues, and vice versa. The following example will clarify this relationship.

Suppose that on your way to work each day you drive by a defunct low-cost apartment project. When new, it was heralded as a great step forward in meeting the needs of the poor. Now it is a monument to failure. You see graffiti on the walls, boarded-up entrances, broken windows, and garbage and other litter on the lawns. In short, it is an eyesore that cries out for demolition.

You begin to ***wonder***: Why didn't it succeed? Is this project typical or atypical of government programs? You realize that this is an issue rather than a problem because it evokes conflicting responses. (You probably have heard or read some of the responses.) Intrigued, you ***investigate***. First you check the origin of the housing project and find that it was part of the Great Society program of the 1960s and 1970s, a massive attempt to wipe out poverty. Digging deeper, you find that implementing the program cost hundreds of billions of dollars without having any lasting effect on poverty, and that it has supported a number of food and medical assistance programs as well as low-cost housing projects. You learn, too, that many housing projects have gone

[9] For more information on Walter Reed, see www.wramc.amedd.army.mil/welcome/history/index1.htm.

through the same stages as this one—that is, they first became run-down, then drug- and gang-infested, and finally scheduled for demolition.

Next you ***speculate*** about the possible reasons for the failure of the government's efforts to help the poor. Perhaps the programs are at fault. For example, they might be insufficiently funded or poorly designed and managed, in which case they would need to be redesigned, more generously funded, or placed under different (perhaps private) management. Or perhaps the people being helped lacked certain attitudes and skills necessary for self-sufficiency and successful living. The programs might have done little if anything to remedy this deficiency or might even have aggravated the condition. For example, the programs might have contributed to a welfare mentality, characterized by the feeling among the poor that the government has an obligation to provide them with food, shelter, and clothing and that this provision is a right they need not work for or otherwise earn.

Finally, you ***evaluate*** by determining which explanation for the government's failure is most reasonable in light of the evidence. Is it insufficient funding, poor program design, ineffective management, the counterproductive effect of increasing poor people's dependency, or some other explanation?[10]

At this point, the W.I.S.E. approach will have enabled you to reach an informed opinion about the *issue* of public welfare. Moreover, in the process of doing so, it will have identified several *problems*—the difficulty of improving housing management, eliminating drug trafficking in public housing, overcoming the welfare mentality. You might be content to leave those problems to others, but if you want to solve them, you again would use the W.I.S.E. approach. Of course, there would be no need to repeat the first step because your analysis of the issue would have provided the necessary perspective. Thus, you would begin by investigating the particular problem more deeply, then speculate about possible solutions, and finally evaluate the solutions and choose the best one.

In this example, addressing the issue with the W.I.S.E. approach led to identifying (and perhaps solving) related problems. In other cases, the procedure might be reversed—that is, addressing a problem with the W.I.S.E. approach might lead you to identify issues that need to be resolved.

A CAUTION ABOUT BIAS

When you evaluate an argument, the greatest obstacle to critical thinking is not the complexity of the issue or the variety of viewpoints to be considered. It is, instead, your own biases. Here is a fairly typical example of how bias can stifle critical thinking.

[10] The best explanation could be *a combination* of these deficiencies.