

THINK CRITICALLY

A group of rowers in a boat on water, with a woman in the foreground looking intensely at the camera. The rowers are wearing dark blue and white athletic gear. The water is slightly blurred, suggesting motion. The overall tone is serious and focused.

2016
FACIONE
GITTENS

Think Critically

*To students and teachers everywhere,
may developing critical thinking help you
stay forever young.*

Think Critically

Third Edition

Peter Facione

Carol Ann Gittens

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This third edition benefited from Benjamin Hamby's insightful, positive, and helpfully detailed review of the second edition and from many follow-up conversations during the drafting of this edition. You may download Dr. Hamby's review of *Think Critically* from academia.edu.

It was again a pleasure be working with the people at Pearson Education. Carol and I are grateful to everyone, including the publisher, the marketing director, the permissions and images people, the designers, the copyeditors, and many more. Our project directors, Melissa Sacco, Richard DeLorenzo, and Veronica Grupico deserve special thanks. We thank our senior editor, Debbie Coniglio, for her singular drive and vision, and for bringing a plethora of digital assets and resources to *Think Critically*.

Co-author Peter writes, "Good ideas come from thinking and discussing things with other people. Great ideas come when that other person happens to be brilliant and wise. The ideas in this book come from a lifetime of those kinds of experiences, but mostly from talking and thinking with the one brilliant and amazing person who has shared that lifetime with me. Through her words and ideas, she contributed inestimably to this book, to other books, to a myriad of projects both professional and domestic, and to every other part of my life. No 'thank you' can do justice to all that I owe to her. But let me say it anyway. Thank you, Noreen."

Co-author Carol Gittens writes, "When Pete asked me to join him as a main author of the second and subsequent editions, I jumped at the opportunity to add my voice to a text that is designed to nurture students' critical thinking skills and habits of minds, not only to promote success in the academic arena, but to promote success in life. I would like to express my gratitude to my long-time research colleague and professional mentor Peter Facione and by extension his wife and fellow colleague, Noreen, for extending our scholarly partnership to include this project. Even more importantly, I want to acknowledge and thank my wonderful husband William who supported me unconditionally even when my efforts on this book required more of my attention than he or our children would have wished to share."

Preface

In “Forever Young” songwriter Bob Dylan expressed our hopes for all who learn with and teach with *THINK Critically*. What more could we wish for one another than we all should seek to know the truth, walk in the light of well-trained reason, be courageous, have the intellectual integrity to stand strong, and that, no matter what our chronological age, that we should stay mentally forever young?

This book aims to strengthen critical thinking skills and nurture the courageous desire to seek truth by following reasons and evidence wherever they lead. We all may have different beliefs, values, perspectives, and experiences influencing our problem solving and decision making. But we share the human capacity to be reflective, analytical, open-minded, and systematic about thinking through our problems and choices, so that we can make the best judgments possible about what to believe or what to do. That process of well-reasoned, reflective judgment is critical thinking. Exercising our critical thinking helps our minds become stronger, healthier, and more youthful.

Our approach, proven successful by us and by others, is simple, practical, and focused. To strengthen critical thinking skills, we have to use them. To build positive critical thinking habits of mind, we have to see critical thinking as the optimal approach for solving real-world problems and making important decisions. Every chapter of this book builds critical thinking skills and engages critical thinking habits of mind in every way possible. Why? Because we believe with every fiber of our beings that critical thinking is all about real life, and so the very best way to build strong critical thinking is to use engaging material from the widest possible range of real-life situations.

“Knowing about” is not the same as “using.” It is more important that a person *learn how to use* critical thinking to make the best judgments possible than that the person memorize gobs of technical vocabulary and theory about critical thinking. Yes, learning about critical thinking certainly can expedite things. But engaging in critical thinking is the payoff. That is why there are hundreds of exercises of many different kinds woven into the written text and each chapter’s digital learning support assets. There is no substitute for learning by doing. So, here’s a plan:

Chapters 1 and 2 explain what critical thinking is, why it is so vitally important to all of us, and how critical thinking connects to our academic studies and

to our personal, professional, and civic lives. Chapter 3 builds immediately on the theme of the practical value of critical thinking by describing the IDEAS approach to problem solving and then applying that approach to the kinds of problems typically encountered by college students of all ages.

Chapters 4–9 are building block chapters, each addressing one or another of the core critical thinking skills in the context of real-world applications. Chapters 4 and 5 focus on the skills of interpretation and analysis; when we can understand what people are saying, we can articulate the reasons being advanced on behalf of a particular claim or choice. Without these vital critical thinking skills we wander in a cloud of confusion, not really knowing what things might mean or why people, including ourselves, think what they think. Chapters 6, 7, 8, and 9 focus on the skill of evaluation as applied to the truthfulness of claims, the trustworthiness of so-called experts, and the quality of arguments.

Chapters 10 and 11 connect critical thinking to contemporary understandings of human decision making. Illustrating the risks and the benefits of our heuristically driven snap judgments and releasing ourselves from the grip that our past decisions can have on our current thinking are the two purposes of Chapter 10. Chapter 11, by contrast, provides multiple strategies for approaching decision making reflectively. Together these two chapters emphasize the essential critical thinking skills of self-monitoring and self-correction, along with the habits foresight, open-mindedness, and truth seeking

The three most important chapters of this book are 12, 13, and 14. Why? Because comparative reasoning, ideological reasoning, and empirical reasoning are the three most widely used methods human beings have for supplying reasons on behalf of their beliefs and ideas. With real-world examples, some that are disturbing in fact, these three chapters focus on the core critical thinking skills of inference and explanation, because drawing conclusions and explaining one’s reasons, even to one’s self, in real life are products of our comparative, ideological, and empirical reasoning.

Chapters 15 through 19 are joyful explorations of the diverse applications of critical thinking—in writing, in ethical decision making, in logic, in the social sciences, and in the natural sciences. Thinking like professionals, instead of simply studying about them or trying to memorize what they may have said, is way more fun, and much more effective learning.

We authors offer all who encounter *THINK Critically* this Dylanesque blessing: That you should have a strong foundation, even in the shifting winds of change, that joy should fill your heart and learning guide your life, and, of course, that by using your mind to reflect on what to believe and what to do, that you should make good decisions and stay forever young.

Instructor Resources

Additional resources found in the Instructor Resource Center include the following:

- Critical Thinking in the Social Sciences
- Critical Thinking in the Natural Sciences
- PowerPoint Presentations
- Test Bank
- Chapter Opener Videos
- Chapter Review Videos
- Writing Space Essay Prompts
- Simulations
- Explorer Activities

What's New to This Edition

- Newly developed tools—videos, argument maps, simulations, data explorations, truth tables, and graphics—that are woven with the core narrative
- Both new and updated examples and exercises connect critical thinking to substantive, real-world concerns

- Emphasis on critical thinking across the curriculum and on problem solving for student success
- New chapters on Ethical Decision Making and on Declarative Logic
- Expanded individual and group writing opportunities, more emphasis on student diversity, and updated treatment of argument, deduction, and induction
- STEM supplement chapter on critical thinking in the natural and social sciences

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About the Authors

Peter A. Facione, PhD, has dedicated himself to helping people build their critical thinking to become better problem solvers and decisions makers. He does this work not only to help individuals and groups achieve their own goals, but also for the sake of our freedom and democracy. Facione draws on experience as a teacher, consultant, business entrepreneur, university dean, grandfather, husband, musician, and sports enthusiast. Now he is taking his message about the importance of critical thinking directly to students through *THINK Critically*.



"I've paid very close attention to the way people make decisions since I was 13 years old," says Facione. "Some people were good at solving problems and making decisions; others were not. I have always felt driven to figure out how to tell which were which." He says that this led him as an undergraduate and later as a professor to study psychology, philosophy, logic, statistics, and information systems as he searched for how our beliefs, values, thinking skills, and habits of mind connect with the decisions we make, particularly in contexts of risk and uncertainty.

A native Midwesterner, Facione earned his PhD in Philosophy from Michigan State University and his BA in

Philosophy from Sacred Heart College in Detroit. He says, "Critical thinking has helped me be a better parent, citizen, leader, consultant, teacher, writer, coach, husband, and friend. It even helps a little when playing point guard!" In academia, Facione served as provost of Loyola University–Chicago, dean of the College of Arts and Sciences at Santa Clara University, and dean of the School of Human Development and Community Service at California State University–Fullerton. "As a dean and provost, I could easily see that critical thinking was alive and well in every professional field and academic discipline."

Facione spearheaded the international study to define critical thinking, sponsored by the American Philosophical Association. His research formed the basis for numerous government policy studies about critical thinking in the workplace, including research sponsored by the U.S. Department of Education. Published by Insight Assessment, his tools for assessing reasoning are used around the world in educational, business, legal, military, and health sciences. Today, Peter operates his own business, *Measured Reasons*. He is senior level consultant, speaker, writer, workshop presenter. His work focuses on strategic planning and leadership decision making, in addition to teaching and assessing critical thinking. With his wife, who is also his closest research colleague and co-author of many books and assessment tools, he now lives in sunny Los Angeles, which he says, "suits [him] just fine." You can reach him at pfacione@measuredreasons.com.

Carol Ann Gittens, PhD, is an Associate Dean in the College of Arts & Sciences at Santa Clara University (SCU). She is an associate professor with tenure in the Liberal Studies Program and directs SCU's undergraduate pre-teaching advising program and the interdisciplinary minor in urban education designed for students interested in pursuing careers in PreK-12 education.



Gittens was the founding Director of Santa Clara University's Office of Assessment from 2007 to 2012. As assessment director, she performed key activities related to institutional re-accreditation, educated academic and

cocurricular programs in the assessment of student learning, and designed and oversaw an innovative multiyear, rubric-based assessment plan for a new core curriculum. She is an educational assessment mentor and accreditation evaluator for the Western Association of Schools and Colleges (WASC) as well as Board of Institutional Reviewers member of the California Commission on Teacher Credentialing (CTC), and a senior research associate with Insight Assessment, LLC.

The central focus of Gittens' research is on the interface of critical thinking, motivation, mathematical reasoning, and academic achievement of adolescents and young adults from diverse cultural and ethnic backgrounds. Dr. Gittens is an author or co-author of numerous articles and assessment tools focusing on critical thinking skills, numeracy, and dispositions in children and adults. As of this writing, her forthcoming paper is "Assessing Numeracy in the Upper Elementary and Middle School Years."

Gittens' consulting activities include working with college faculty, staff and administrators, PreK-12 educators, as well as business executives, managers, and employees. Dr. Gittens' areas of expertise include assessment of institutional effectiveness and student learning outcomes, institutional and professional accreditation planning, translating strategic vision into measurable objectives, designing sustainable assessment systems at all levels of the institution, critical thinking pedagogy and assessment, integrating critical thinking and information literacy across the curriculum and in cocurricular programs, as well as statistics and assessment design for individuals and institutions.

Gittens earned her PhD in Social and Personality Psychology from the University of California at Riverside. She received her BA in Psychology and Women's Studies from the University of California at Davis. Prior to her appointment at Santa Clara University she taught at California State University, San Bernardino and at Mills College in Oakland, California. Gittens and her husband live in California's Silicon Valley with their teenaged daughter and son, and their 4-year-old daughter. She is an active parent volunteer in her children's school, and is involved with K-12 schools in the local community, offering teacher training workshops on nurturing and assessing students' critical thinking.

Chapter 1

The Power of Critical Thinking



When students study together, both teach and both learn.

WHY is critical thinking important?

HOW can we evaluate our critical thinking?

WHAT does “critical thinking” mean?



Learning Outcomes

- 1.1** Explain why critical thinking is important in a world filled with risk and uncertainty by supplying reasons and examples that relate to your own life, to the well-being of your community, and to the preservation of a free and open society.
- 1.2** Explain why a strong critical thinker’s healthy sense of skepticism is not the same as negativity and cynicism. From your own experience supply examples showing the unfortunate results of a failure of critical thinking as here defined.
- 1.3** Using the “Holistic Critical Thinking Scoring Rubric” as your tool for evaluation, evaluate the quality of the critical thinking evident in samples of written material and explain which elements in the written material led you evaluate it as you did.

Walking down 10th Street in Hermosa Beach the other day, I saw a helmetless young man skillfully slalom his skateboard downhill toward the beach. Ignoring the stop sign at Hermosa Boulevard, he flashed across all four lanes of traffic and coasted on down the hill. My immediate reaction was “Whew! Lucky that that guy wasn’t killed!” because I had often seen cars on Hermosa roll through that particular stop sign. Whatever was occupying his attention, the skateboarder did not appear to have self-preservation on his mind that day!

Whether he reflected on it or not, the skater *decided* to run the stop sign. Similarly, we all make decisions all the time, with some of our choices made more thoughtfully than others. We’ve all underestimated obstacles, overlooked reasonable options, and failed to anticipate likely consequences. Life will continue to present us with our full share of problems, and when we err, we often think about the better decisions we could have made if we’d given it a little more thought.

Critical thinking is the process of reasoned judgment. That is, judgment that is both purposeful and reflective. Because this book is about that process, it is about *how to go about deciding* what to believe or what to do. This is not a book about what we should believe or do. The purpose of the book is to assist you in strengthening your own critical thinking skills and habits of mind so you solve problems and make decisions more thoughtfully for yourself.

1.1 Risk and Uncertainty Around

We might not skateboard through an intersection, but none of us can escape life’s risks and uncertainties. Uncertainties apply to potentially good things, too. For example, each of us might be uncertain when choosing a major, taking a part-time job, making a new friend, or responding to a disaster stricken nation’s call for volunteers. You never know what new friendships you will make, what new skills you will acquire, what new opportunities might emerge for you, how your efforts will benefit other people, or how much satisfaction you may feel. Whatever the choice being contemplated or the problem being addressed, to maximize our chances for welcome outcomes and to minimize our chances for undesirable outcomes, we need to employ purposeful, reflective judgment. Sure, winning is great, but it’s just not a good idea to play poker unless we can afford to lose. We need to think ahead, to plan, and to problem solve. This means we need **critical thinking**.

Often, what seems like an exclusively personal decision ends up having consequences that go far beyond just ourselves. Everyone knows that driving while wasted can lead



“Dude! What are you thinking?”

to tragic results for passengers, other drivers and pedestrians. That one is obvious. And DUI is illegal. But even choices that seem to be perfectly innocent can have unexpected impacts on other people. Think, for example, about deciding to go back to college as an adult. You try to anticipate what it will cost, how much time it will take, whether you can manage being a college student along with all the other responsibilities in your life. Suppose you consider the risks and the uncertainties, and the pros and cons as best you can anticipate them, and end up deciding to take on all those challenges. In due time you graduate. With your new qualifications you get offered a better job, one that requires moving to a new neighborhood or new city. That means living further from your old friends. But, it also means a new home, better pay, and new friends. You think, although I tried to anticipate all the consequences, I really could not have known all the ways my decision would affect all the people I will be leaving, and all the people I will meet.

Critical Thinking and a Free Society

We are fortunate in a society that values self-reliance, economic competition, and individual initiative. The stronger our critical thinking skills and habits of mind, the greater our prospects for success, whatever the endeavor. Given the pace of innovation and the fierceness of the competition, and the unpredictability of world events, today more than at any time in the past 70 years businesses are concerned to find workers who can solve problems, make good decisions, learn new things, and adapt to an uncertain future. To succeed in a global high-tech world, a corporation will have to hire workers with strong critical thinking and cultivate a corporate culture that fosters

JOURNAL

How Would You Describe Your CT Skills?

Employers consistently report that they prioritize skills in critical thinking and communication when evaluating job applicants. Employers want to hire people who can solve customers' problems and make good business decisions. And the employers want people who represent the company well and communicate clearly, understand directions, and carry out assignments.

How would you describe to a prospective employer your critical thinking skills and communication skills? Use examples.

strong critical thinking.¹ In a 2013 survey of 318 employers 93% agreed that a job candidate's "demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than their undergraduate major."²

But if information is power, then controlling the flow of information is wielding power. Any government, any agency, any group of whatever kind that can withhold information or distort it to fit official orthodoxy is in a much better position to suppress dissenters and maintain its position of control. As we have seen recently in Syria, Egypt, Yemen, Libya, China, the Central African Republic, North Korea, Lebanon, Iraq, Ukraine, Thailand, Kenya, Afghanistan, and elsewhere, cutting off Internet access, expelling foreign journalists, disabling cell phone relays, and attempting in every way to block messages on social

media have become standard tactics for suppressing protests and maintaining power. All done to curtail the free flow of accurate information.

We who live in the United States are also fortunate because of the high value we place on freedom—including the freedom to think for ourselves. In a free society education is about learning how to think for yourself, learning how to seek the information you need, learning how to correct mistaken assumptions, how to evaluate the claims people make, how to reason well, and how to detect and resist fallacious reasoning. In a free society the power of government is used to protect the right to free and open inquiry, the right to share what we learn, and the right to collaborate with others to make better decisions and to learn more about the world. Watch "Why Critical Thinking." Find this short video and more by searching "Peter Facione" on YouTube.

A closed society does not permit the freedom to think, it fears and it suppresses learning. A closed society, whether it is a government, a corporation, a religion or whatever, stifles independent critical thinkers, punishes those who do not adhere to the party line, denies access to full and accurate information, and buries scientific findings and policy recommendations that run counter to interests of those in power. The worst of these closed societies equate education with memorized orthodoxy, label dissenters as traitors, and, if need be, use ridicule, bullying, disinformation, deceit, character assassination, and in the worst cases physical assassination—whatever it takes, including creating martyrs for the cause, faking enemy threats, lying to the media, destroying document and so on—to achieve its goals.³

Positive Examples of Critical Thinking

- A person trying to interpret an angry friend's needs, expressed through a rush of emotion and snide comments, to give that friend some help and support
- A manager trying to be as objective as possible when settling a dispute by summarizing the alternatives, with fairness to all sides to a disagreement
- A team of scientists working with great precision through a complex experiment in an effort to gather and analyze data
- A creative writer organizing ideas for the plot of a story and attending to the complex motivations and personalities of the fictional characters
- A person running a small business trying to anticipate the possible economic and human consequences of various ways to increase sales or reduce costs
- A master sergeant and a captain working out the tactical plans for a dangerous military mission.
- A soccer coach working during halftime on new tactics for attacking the weaknesses of the other team when the match resumes
- A student confidently and correctly explaining exactly to his or her peers the methodology used to reach a particular conclusion, or why and how a certain methodology or standard of proof was applied
- An educator using clever questioning to guide a student to new insights
- Police detectives, crime scene analysts, lawyers, judges, and juries systematically investigating, interrogating, examining, and evaluating the evidence as they seek justice
- A policy analyst reviewing alternative drafts of product safety legislation while determining how to frame the law to benefit the most people at the least cost
- An applicant preparing for a job interview thinking about how to explain his or her particular skills and experiences in a way that will be relevant and of value to the prospective employer
- Parents anticipating the costs of sending their young child to college, analyzing the family's projected income, and budgeting projected household expenses in an effort to put aside some money for that child's future education



Films like *The Insider*, *Promised Land*, *Cry Freedom*, *Syriana*, *Wag the Dog*, *Body of Lies*, *Seeds of Death*, and *The Panama Deception* give us insights into how it is possible for corporate and government greed, orthodoxy, and lust for power to crush freedom, distort the truth, and destroy lives. Some films in this genre are well researched, fair, and accurate; others are fictional exaggerations or fabrications. Either way, they all illustrate the dire consequences of passivity, apathy, and indifference toward matters of public policy. Given the possibilities, strong critical thinking suggests vigilant readiness to ask tough questions about what is being done in our name.

“Our whole constitutional heritage rebels at the thought of giving government the power to control men’s minds.”

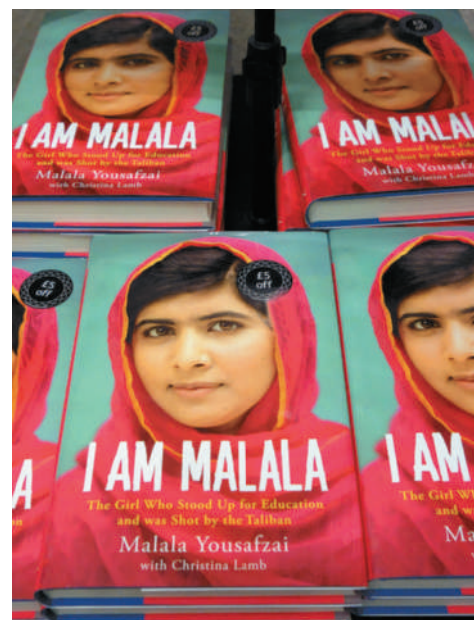
Thurgood Marshall, Former U.S. Supreme Court Justice⁴

Why is American higher education internationally admired and yet feared? One reason is that our colleges have the potential to teach critical thinking. The upside is great progress in learning, wealth and culture, and hence huge benefits for society. Problem solvers using critical thinking have achieved massive breakthroughs in science, technology, engineering, commerce, and the arts. But, at the same time, leaders around the world know that when the people are given a good education and begin thinking for themselves, things get harder for would-be tyrants. People who are thinking for themselves are more apt to disagree, policy issues become more complicated to resolve, public discourse more confusing, the “old ways” are questioned, and decision making takes more time.

Strong critical thinking demands a healthy skepticism wherever entrenched organizational power is concerned. Strong critical thinkers know that defending the freedom to think demands vigilance. Passivity and indifference toward thinking and learning weaken not only our bodies but our minds as well. None of us want to wake up one fine day groggy, cross-eyed, and hung over from Fantasy Football, nonstop Grand Theft Auto, double cheese and bacon burgers, vacuous Hollywood gossip, online hoarding sprees, and stale beer, only to discover that while we were otherwise occupied our rights and freedoms were quietly, yet systematically, stripped away. We believe that one way to protect

our cherished and hard-won freedoms is by using our critical thinking to assure open scientific inquiry, access to complete and accurate information, and the right to ask challenging questions, and follow the reasons and the evidence wherever they may lead.

But we do not need to rely only on films and novels to illustrate our point. Recent history shows what happens when people are not vigilant defenders of open, objective, and independent inquiry. We saw the results to a greater or lesser extent in Hitler’s Germany, Stalin’s Russia, Mao Tse Tung’s China, and, sadly, in the twenty-first century.



What would you have done if religious extremists attacked you or your daughter for seeking an education?

See, for example, the autobiography *And Then They Came for Me*, by Maziar Bahari, 2011, and then Google the phrase “and then they came for me” for several even more recent examples of similar incidents around the world. Or consider how her co-religionists punished young Malala Yousafzai, a female, just for wanting the freedom to learn. In 2014 the systematic suppression of the freedom to learn, critical thinking, and science was the purpose of school curriculum changes imposed under threat of physical punishment by extremists in territories controlled by the group known as the “Islamic State.”⁵ Where critical thinking, science, and open inquiry by men or by women are crimes, a society cannot call itself “free.”



If he were alive today, American folk song legend, Pete Seeger, might sing, “Where have all the waters gone?”

The One and the Many

Individual decisions can seem isolated and yet when they accumulate, they can have a far-reaching impact. For instance, in China the one-child policy has been in force for about 30 years. Culturally, there has always been a strong preference for male children; and if families could only have one child, most wanted a boy. In household after household, family after family made the choice to do whatever seemed necessary, including infanticide, to ensure a male heir. The collective impact of those millions of individual decisions now burdens that nation. In some villages, the ratio of unmarried men to unmarried women is 20 to 1. Today brides fetch payments as high as five years of family income.⁶ Those parents who decided to raise their first-born daughters sure look smart now.

Around seven billion members of our species, give or take, share a planet in which economic, cultural, political, and environmental forces are so interconnected that the decisions of a few can impact the lives of many. Short-sighted and self-interested decisions made by corporate executives, bankers, stock traders, borrowers, and government regulatory agencies plunged the world into a global economic depression, which has cost trillions of dollars, devastated honest and well-run companies, bankrupted pension plans, destroyed families, and put tens of millions of people out of work. What were the decision makers thinking? What blinded all of us to the foreseeable consequences of our choices? Did we think that there wouldn’t be adverse consequences if we all ran our credit card and mortgage debts to levels that were beyond our capacity to repay those debts? For some insights into the poor critical thinking that contributed to this global economic meltdown watch the HBO film *Too Big to Fail*.

The historical evidence suggests that civilizations rise and fall, that economies flourish and flounder, that the arts are encouraged and suppressed, that advances

in learning are made and then forgotten. As a species we have very few advantages, other than our oversized brain and the critical thinking it can generate. We would be unwise not to use what little we have. Often catastrophic events, like the plagues that decimated Europe in the fifth and twelfth centuries, are beyond the ability of the science of the time to predict or to control. The same goes for the prolonged drought that triggered the dust bowl of the 1930s, the climate-changing drought suspected of driving the Anasazi out of North American Southwest.⁷ But what about droughts that we can predict? What about the water crisis we have made for ourselves today in the North American Southwest? We know that we foolishly over-use our water resources, waste water on silly things like trying to have green lawns in desert lands. We know that unless something changes, the Columbia River and the Sierra Nevada watershed cannot support the tens of millions of people, and the homes, farms, businesses, fisheries, forests, wildlife, pets, resorts, fountains, golf courses, schools, hospitals, and fire departments. Strong critical thinking tells us that we need to reform water policy and change our ways of using that essential resource. But change is so slow in coming. We cannot kick the empty water can any further down the dusty road. What are we thinking?

“Very few really seek knowledge in this world. Mortal or immortal, few really ask. On the contrary, they try to wring from the unknown the answers they have already shaped in their own minds—justification, explanations, forms of consolation without which they can’t go on. To really ask is to open the door to the whirlwind. The answer may annihilate the question and the questioner.”

Anne Rice’s character, the vampire Marius in *The Vampire Lestat*.⁸



Why farms vs. cities if everyone knows Water = Jobs & Food & Survival?

1.2 What Do We Mean by “Critical Thinking”?

At this point you might be saying, “OK, I get it. Critical thinking is important. But what *is* critical thinking, exactly?” To answer that question precisely, an international group of 46 recognized experts in critical thinking research collaborated. The men and women in this group were drawn from many different academic disciplines, including philosophy, psychology, economics, computer science, education, physics, and zoology.

Expert Consensus Conceptualization

For more than a year and a half, from February 1988 through September 1989, the group engaged in a consensus-oriented research process developed by the Rand Corporation and known as the “Delphi” method.⁹ The challenge put to the experts was to come up with a working consensus about the meaning of “critical thinking,” which could serve instructional and assessment purposes from K–12 through graduate school, and across the full range of academic disciplines and professional fields. They also asked themselves questions that relate to Chapter 2, namely: “What are the core critical thinking skills and subskills? How can we strengthen those skills in students? Who are the best critical thinkers we know, and what habits of mind do they have that lead us to consider them the best?”

Long story short, the expert consensus defined “critical thinking” as “the process of purposeful, self-regulatory judgment.”¹⁰ The purpose is straightforward: to form a well-reasoned and fair-minded judgment regarding what to believe or what to do. The “self-regulatory” part refers

to our capacity to reflect on our own thinking process. We can monitor our own thinking, spot mistakes, and make needed corrections to our own problem solving and decision making.¹¹

Strong critical thinking—making well-reasoned judgments about what to believe and what to do—is essential to consistently successful decision making. For many years we authors have consulted with various branches of the U.S. military, including Special Ops, with senior business executives and mid-level managers, and with educators, policy makers, health care professionals, scientists, jurists, and engineers. Time and again we learn that strong critical

thinking can contribute to achieving goals and that poor critical thinking contributes to mission failure. Strong critical thinking is essential wherever the quality of one’s decisions and the accuracy of one’s beliefs make a difference.

Critical thinking is not the *only* vital element, don’t get us wrong. Knowledge, dedication, training, and ethical courage also factor into the formula for success. We often learn more from our failures than from our successes; when we examine unsuccessful operations we often find that individuals or groups have failed, somewhere along the line, to make well-reasoned judgments. Failures of critical thinking can result in some truly unfortunate outcomes, as the examples in the figure indicate. Can you think of any such instances in your own experience?

Failures of critical thinking contribute to...

patient deaths / lost revenue /
ineffective law enforcement /
job loss / gullible voters /
garbled communications /
imprisonment / combat
casualties / upside down mortgages /
vehicular homicide / bad decisions /
unplanned pregnancies / financial
mismanagement / heart disease / family
violence / repeated suicide attempts /
divorce / drug addiction / academic
failure / ... / ... /

WHAT
WERE WE
THINKING?



Failures of critical thinking often contribute to some of the saddest and most unfortunate accidents. In 2009, for example, 288 people died in the crash of an Air France

jetliner. Investigators who examined the crash and its causes indicated that the pilots might have had enough time to prevent the disaster had they realized that the plane was stalling, instead of climbing to a safe altitude. But they appear to have misinterpreted the warning signals and wrongly analyzed their problem, which led them to make the wrong inferences about what they should do.¹² Asiana Air Flight 214 crash-landed at SFO in 2013 because of the decision to permit an inexperienced pilot to practice landing a jetliner full of passengers.¹³

Occasionally we see in the news that some poor individual has had a tragic lapse in good judgment. Like the three young people who stepped passed the guard rails to take pictures at Yosemite Park's Vernal Falls. Other park visitors called to them, urging them to get back to safety, but they did not. Then suddenly one fell, the other two tried to help, and all three were swept over the falls to their deaths.¹⁴ Sad as it was, we have to ask ourselves, what were they thinking? If they had thoughtfully considered the risks and benefits, we doubt that they would have made the tragic decision to ignore the posted warnings.

Realizing that strong critical thinking often results in positive outcomes, but failures of critical thinking could lead to major problems, the experts who were asked to define critical thinking determined that it was best to focus on the *process of judgment*. What they wanted to capture was that strong critical thinking was reflective, well-reasoned, and focused on a specific purpose, such as what to do or what to believe. "Should we ignore the posted warnings?"

Given the expert consensus definition of critical thinking as purposeful reflective judgment, one of the first things the experts realized was that critical thinking was a "pervasive human phenomenon." Critical thinking is occurring whenever an individual or a group of people

makes a reasoned and reflective judgment about what to believe or what to do. They also realized that strong critical thinking was thoughtful and informed, not impulsive nor knee-jerk reactive.

How important did the experts think critical thinking was? They put their answer to that question this way: "Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, critical thinking is a pervasive and self-rectifying human phenomenon."

So long as people have problems to solve and decisions to make, so long as they have things to learn and issues to resolve, there will be ample opportunities to use our critical thinking skills and habits of mind.

"Critical Thinking" Does Not Mean "Negative Thinking"

Critical thinking is not about bashing what people believe just to show how clever we are. Nor is critical thinking about using our skills to defend beliefs that we know are untrue or decisions we know are poor. Critical thinking is skeptical without being cynical. It is open-minded without being wishy-washy. It is analytical without being nitpicky. Critical thinking can be decisive without being stubborn, evaluative without being judgmental, and forceful without being opinionated.

Critical thinking skills enable us to seek truth (small "t") with intellectual energy and with integrity. Respect for one another and civil discourse goes hand in hand with strong critical thinking. We can thoughtfully and fair-mindedly reject an idea without ridiculing or embarrassing the person who proposed it.

And we can accept an idea from any source so long as the idea is well-supported with good reasons and solid evidence. The results of applying the critical thinking process speak for themselves by virtue of the quality of the analyses, inferences, and explanations involved. So there is no reason, and very frequently no advantage either, in being aggressive, strident or hostile in how one presents those results.

Strong critical thinking can be independent, it can lead us to diverge from the norm, and it can impel us to challenge cherished beliefs. And, as a result, applying critical thinking skills to a question or issue can be disquieting if not disturbing to ourselves and others. Critical thinking can also be insightful, collaborative, and constructive. And, as in the case of good



"I saw the man's eyes when he went over the falls. That was devastating," says witness.

THINKING CRITICALLY

Risk and Respect



Why do so many vacationers and sightseers foolishly risk their lives each year that our government must post warnings against even the most obvious dangers?

1. According to the National Park Service, over 250 people need to be rescued each year after they have tried to hike down into the Grand Canyon to reach the Colorado River and back up to the rim all in one day. More interestingly, these people tend to be young, healthy males. Why might this be? Is there something the research literature can tell us about the decision making of young healthy males that leads them, more than any other demographic, to take the kinds of risks that result in their needing to be rescued?
2. Group Discussion: Not all risks are unreasonable. Parents worry all of the time about keeping their children safe, but what is the role of risk taking in childhood and



adolescence? Are their “healthy risks” parents should encourage timid children to take? Should children be encouraged to climb trees? Rather than taking one side or the other, as in a debate, try instead to identify and elaborate on the best reasons for both sides of that question. A web search will reveal some interesting posts relating to risk and parenting.

3. Group Discussion: Given our advice about being respectful rather than hostile when applying critical thinking, does that mean that some topics are off limits? Is it even possible to have a respectful reasoned, evidence-based, and fair-minded analysis and evaluation of the truth, our moral, religious, or political opinions? What if people take offense because something they were raised to believe is called into question by seriously applying critical thinking skills to that idea?

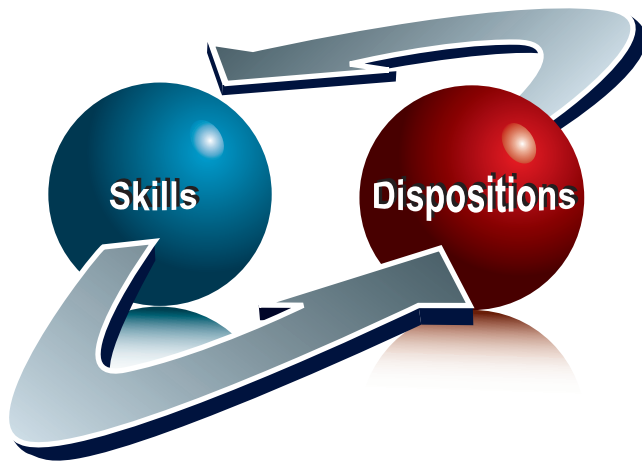
science, critical thinking brings deeper and richer understandings. And too, as in the case of good leadership, critical thinking results in more successful outcomes. The only real mistake is to go forward with beliefs or choices that we know, because of strong critical thinking, are false or foolish.

Improvement Takes Practice

Think for a moment about learning to play a musical instrument or learning to play a sport. In both, improvement comes from practicing the requisite skills and strengthening our resolve to keep at it until we begin to see improvements. As we experience success at the skills part, enjoyment increases, and our disposition to keep applying ourselves grows. And, having an ever more positive

attitude about striving to improve, we tend to enjoy more success as we seek to refine our skills. Each aspect feeds the other. To be a success the player must become not only able but willing, not just skillful but disposed to use those skills.

We learn to play a musical instrument so we can enjoy making music. We learn a sport to enjoy playing the game. We work on our skills and mental dispositions not for their own sake, but for the sake of making music or playing the game. This is true with critical thinking, too. The defining purpose of critical thinking is to make reflective judgments about what to believe or what to do. We will work on both the skill part and the dispositional part as we move through this book. Our purpose as authors is to enable you to become more effective in using critical thinking when you are deciding what to do or what to believe.



Critical Thinking - Willing and Able

There is convincing scientific evidence that students can improve their critical thinking.¹⁵ As with any skills based activity, the key is guided practice. To guide you we loaded this book with exercises, examples, explanations, and topics to really think about. Each represents an opportunity. And, yes, here and there we have included topics/and questions some may find unsettling, maybe even jarring. Why? Because thinking about difficult topics and troubling questions often makes us stronger critical thinkers. Just like with sports or music, those who skip practice should not expect to perform at their best when it really matters. Those who are so closed-minded that they cannot entertain hypotheticals that diverge from their own opinions will find progress in critical thinking difficult. But the rest of us can expect many interesting and enjoyable opportunities to exercise each of our critical thinking skills and to strengthen our critical thinking habits of mind.

1.3 Evaluating Critical Thinking

Even when we are first learning a musical instrument or a sport, we can tell that some of our peers are better at the instrument or the sport than others. We all make progress, and soon we are all doing much better than when we first started. We do not have to be experts to begin to see qualitative differences and to make reasonable evaluations. This, too, is true of critical thinking. There are some readily available ways to begin to make reasonable judgments concerning stronger or weaker uses of critical thinking. The following example illustrates some of these methods.

THE STUDENTS' ASSIGNMENT—KENNEDY ACT

Imagine a professor has assigned a group of four students to comment on the Edward M. Kennedy Serve America Act, signed into law on April 21, 2009. The group has access to the information about the bill at the website for the Corporation for National & Community Service. The bill:

- Dramatically increases intensive service opportunities by setting AmeriCorps on a path from 75,000 positions annually to 250,000 by 2017, and focusing that service on education, health, clean energy, veterans, economic opportunity, and other national priorities.
- Enables millions of working Americans to serve by establishing a nationwide Call to Service Campaign and observing September 11 as the National Day of Service and Remembrance.
- Improves service options for experienced Americans by expanding age and income eligibility for Foster Grandparents and Senior Companions, authorizing a Silver Scholars program, under which individuals 55 and older who perform 350 hours of service receive a \$1,000 education award, which they can transfer award to a child or grandchild.
- Provides for a summer program for students from sixth through twelfth grade to earn a \$500 education award for helping in their neighborhoods.
- Authorizes a Civic Health Assessment comprised of indicators relating to volunteering, voting, charitable giving, and interest in public service to evaluate and compare the civic health of communities.

For more information search "americorps.gov" "nationalservice.gov" and "serve.gov".

THE STUDENTS' STATEMENTS—KENNEDY ACT

STUDENT #1: "My take on it is that this bill requires national service. It's like a churchy service sorta thing. But, u know, like run by the government and all. We all have to sign up and do our bit before we can go to college. That's great. Think about it, how could anyone b against this legislation? I mean, unless they r either lazy or selfish. What excuse could a person possibly have not to serve r country? The president is right, we need to bring back the draft so that r Army has enough soldiers, and we need to fix Wall Street and Social Security and immigration. I don't want to pay into a system all my working life only to find out that there's no money left when I get my chance to retire."