Critical Thinking:
What It Is and Why It Counts

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The late George Carlin worked "critical thinking" into one of his comedic monologue rants on the perils of trusting our lives and fortunes to the decision-making of people who were gullible, uninformed, and unreflective. Had he lived to experience the economic collapse of 2008 and 2009, he would have surely added more to his caustic but accurate assessments regarding how failing to anticipate the consequences of one's decisions often leads to disastrous results not only for the decision maker, but for many other people as well.

After years of viewing higher education as more of a private good which benefits only the student, we are again beginning to appreciate higher education as being also a public good which benefits society. Is it not a wiser social policy to invest in the education of the future workforce, rather than to suffer the financial costs and endure the fiscal and social burdens associated with economic weakness, public health problems, crime, and avoidable poverty? Perhaps that realization, along with its obvious advantages for high level strategic decision making, is what led the Chairman of the Joint Chiefs of Staff to comment on critical thinking in his commencement address to a graduating class of military officers.

> You will recall how you were inspired to **THINK CRITICALLY** and to question without fear, to seek out radically different solutions and to voice them without reprisal, to read widely and deeply, and to examine without end and grow intellectually. . . . What I ask is this: pass it on.

Navy Adm. Mike Mullen, June 11, 2009

Teach people to make good decisions and you equip them to improve their own futures and become contributing members of society, rather than burdens on society. Becoming educated and practicing good judgment does not absolutely guarantee a life of happiness, virtue, or economic success, but it surely offers a better chance at those things. And it is clearly better than enduring the consequences of making bad decisions and better than burdening friends, family, and all the rest of us with the unwanted and avoidable consequences of those poor choices.

Defining "Critical Thinking"

Yes, surely we have all heard business executives, policy makers, civic leaders, and educators talking about critical thinking. At times we found ourselves wondering exactly what critical thinking was and why is it considered so useful and important. This essay takes a deeper look at these questions.

But, rather than beginning with an abstract definition – as if critical thinking were about memorization, which is not the case – give this thought experiment a try: Imagine you have been invited to a movie by a friend. But it's not a movie you want to see. So, your friend asks you why. You give your honest reason. The movie offends your sense of decency. Your friend asks you to clarify your reason by explaining what bothers you about the film. You reply that it is not the language used or the sexuality portrayed, but you find the violence in the film offensive.

Sure, that should be a good enough answer. But suppose your friend, perhaps being a bit philosophically inclined or simply curious or argumentative, pursues the matter further by asking you to define what you mean by "offensive violence."

Take a minute and give it a try. How would you define "offensive violence" as it applies to movies? Can you write a characterization which captures what this commonly used concept contains? Take care, though, we would not want to make the definition so broad that all movie violence would be automatically "offensive." And check to be sure your way of defining "offensive violence" fits with how the rest of the people who know and use English would understand the term. Otherwise they will not be able to understand what you mean when you use that expression.

Did you come up with a definition that works? How do you know?

What you just did with the expression "offensive violence" is very much the same as what had to be done with the expression "critical thinking." At one level we all know what "critical thinking" means — it means good thinking, almost the opposite of illogical, irrational, thinking. But when we test our understanding further, we run into questions. For example, is critical thinking the same as creative thinking, are they different, or is one part of the other? How do critical thinking and native intelligence or scholastic aptitude relate? Does critical thinking focus on the subject matter or content that you know or on the process you use when you reason about that content?

It might not hurt at all if you formed some tentative preliminary ideas about the questions we just raised. We humans learn better when we stop frequently to reflect, rather than just plowing from the top of the page to the bottom without coming up for air.

Fine. So how would you propose we go about defining "critical thinking." You do not really want a definition plopped on the page for you to memorize, do you? That would be silly, almost counterproductive. The goal here is to help you sharpen your critical thinking skills and cultivate your critical thinking spirit. While memorization definitely has many valuable uses, fostering critical thinking is not among them. So, let's look back at what you might have done to

define "offensive violence" and see if we can learn from you. Did you think of some scenes in movies that were offensively violent, and did you contrast them with other scenes that were either not violent or not offensively violent? If you did, good. That is one (but not the only) way to approach the problem. Technically it is called finding paradigm cases. Happily, like many things in life, you do not have to know its name to do it well.

> Nothing in all the world is more dangerous than sincere ignorance and conscientious stupidity.

Martin Luther King, Jr.[xiv]

Back to critical thinking – let's ask ourselves to come up with possible examples of strong critical thinking? How about the adroit and clever questioning of Socrates or a good attorney or interviewer? Or, what about the clever investigative approaches used by police detectives and crime scene analysts? Would we not want to also include people working together to solve a problem as they consider and discuss their options? How about someone who is good at listening to all sides of a dispute, considering all the facts, and then deciding what is relevant and what is not, and then rendering a thoughtful judgment? And maybe too, someone who is able to summarize complex ideas clearly with fairness to all sides, or a person who can come up with the most coherent and justifiable explanation of what a passage of written material means? Or the person who can readily devise sensible alternatives to explore, but who does not become defensive about abandoning them if they do not work? And also the person who can explain exactly how a particular conclusion was reached, or why certain criteria apply?

Or, considering the concept of critical thinking from the opposite direction, we might ask what the consequences of failing to use our critical thinking might be. Imagine for a moment what could happen when a person or a group of people decides important matters without pausing first to think things through.

Expert Opinion

An international group of experts was asked to try to form a consensus about the meaning of critical thinking.[1] One of the first things they did was to ask themselves the question: Who are the best critical thinkers we know and what is it about them that leads us to consider them the best? So, who are the best critical thinkers you know? Why do you think they are strong critical thinkers? Can you draw from those examples a description that is more abstract? For example, consider effective trial lawyers, apart from how they conduct their personal lives or whether their client is really guilty or innocent, just look at how the lawyers develop their cases in court. They use reasons to try to convince the judge and jury of their client's claim to guilt or innocence. They offer evidence and evaluate the

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[1] Many useful characterizations of critical thinking by noted theorists and teachers are captured in *Conversations with Critical*

Thinkers, John Esterle and Dan Clurman (Eds.). Whitman Institute. San Francisco, CA. 1993

significance of the evidence presented by the opposition lawyers. They interpret testimony. They analyze and evaluate the arguments advanced by the other side.

Now, consider the example of the team of people trying to solve a problem. The team members, unlike the courtroom's adversarial situation, try to collaborate. The members of an effective team do not compete against each other. They work in concert, like colleagues, for the common goal. Unless they solve the problem, none of them has won. When they find the way to solve the problem, they all have won. So, from analyzing just two examples we can generalize something very important: critical thinking is thinking that has a purpose (proving a point, interpreting what something means, solving a problem), but critical thinking can be a collaborative, noncompetitive endeavor. And, by the way, even lawyers collaborate. They can work together on a common defense or a joint prosecution, and they can also cooperate with each other to get at the truth so that justice is done.

We will come to a more precise definition of critical thinking soon enough. But first, there is something else we can learn from paradigm examples. When you were thinking about "offensive violence" did you come up with any examples that were tough to classify? Borderline cases, as it were — an example that one person might consider offensive but another might reasonably regard as non-offensive. Yes, well, so did we. This is going to happen with all abstract concepts. It happens with the concept of critical thinking as well. There are people of whom we would say, on certain occasions this person is a good thinker, clear, logical, thoughtful, attentive to the facts, open to alternatives, but, wow, at other times, look out! When you get this person on such-and-such a topic, well it is all over then. You have

pushed some kind of button and the person does not want to hear what anybody else has to say. The person's mind is made up ahead of time. New facts are pushed aside. No other point of view is tolerated.

Do you know any people that might fit that general description?
Good. What can we learn about critical thinking from such a case? Maybe more than we can learn from just looking at the easy cases. For when a case is on the borderline, it forces us to make important distinctions. It confronts us and demands a decision: In or Out! And not just that, but why? So, our friend who is fair-minded about some things, but close-minded about others, what to do? Let's take the parts we approve of because they seem to us to contribute to acting rationally and logically and include those in the concept of critical thinking, and let's take the parts that work against reason, that close the mind to the possibility of new and relevant information, that blindly deny even the possibility that the other side might have merit, and call those poor, counterproductive, or uncritical 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."

Spoken by the vampire Marius in *The Vampire Lestat* [vii] 2

Now, formulate a list of cases — people that are clearly strong critical thinkers and clearly weak critical thinkers and some

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2 Spoken by the Vampire Marius in Ann Rice's book *The Vampire Lestat* Ballantine Books. New York, NY. 1985.

who are on the borderline. Considering all those cases, what is it about them that led you to decide which were which? Suggestion: What can the strong critical thinkers do (what mental abilities do they have), that the weak critical thinkers have trouble doing? What skills or approaches do the strong critical thinkers habitually seem to exhibit which the weak critical thinkers seem not to possess?

Core Critical Thinking Skills

Above we suggested you look for a list of mental skills and habits of mind, the experts, when faced with the same problem you are working on, refer to their lists as including *cognitive skills* and *dispositions*.

As to the cognitive skills here is what the experts include as being at the very core of critical thinking: interpretation, analysis, evaluation, inference, explanation, and self-regulation. (We will get to the dispositions in just a second.) Did any of these words or ideas come up when you tried to characterize the cognitive skills — mental abilities — involved in critical thinking?

Quoting from the consensus statement of the national panel of experts: **interpretation** is "to comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria."[3] Interpretation includes the sub-skills of categorization, decoding significance, and clarifying meaning. Can you think of examples of interpretation? How about recognizing a problem and describing it without bias? How about reading a person's intentions in the expression on her face; distinguishing a main idea from subordinate ideas in a text; constructing a tentative categorization or way of organizing something you are studying; paraphrasing someone's ideas in your own words; or, clarifying what a sign, chart or graph means? What about identifying an author's purpose, theme, or point of view? How about what you did above when you clarified what "offensive violence" meant?

Again from the experts: **analysis** is "to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions." The experts include examining ideas, detecting arguments, and analyzing arguments as sub-skills of analysis. Again, can you come up with some examples of analysis? What about identifying the similarities and differences between two approaches to the solution of a given problem? What about picking out the main claim made in a

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[3] The findings of expert consensus cited or reported in this essay are published in *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction.* Peter A. Facione, principle investigator, The California Academic Press, Millbrae, CA, 1990. (ERIC ED 315 423). In 1993/94 the Center for the Study of Higher Education at The Pennsylvania State University undertook a study of 200 policy-makers, employers, and faculty members from two-year and four-year colleges to determine what this group took to be the core critical thinking skills and habits of mind. The Pennsylvania State University Study, under the direction of Dr. Elizabeth Jones, was funded by the US Department of Education Office of Educational Research and Instruction. The Penn State study findings, published in 1994, confirmed the expert consensus described in this paper.

newspaper editorial and tracing back the various reasons the editor offers in support of that claim? Or, what about identifying unstated assumptions; constructing a way to represent a main conclusion and the various reasons given to support or criticize it; sketching the relationship of sentences or paragraphs to each other and to the main purpose of the passage? What about graphically organizing this essay, in your own way, knowing that its purpose is to give a preliminary idea about what critical thinking means?

The experts define **evaluation** as meaning "to assess the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief, or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation." Your examples? How about judging an author's or speaker's credibility, comparing the strengths and weaknesses of alternative interpretations, determining the credibility of a source of information, judging if two statements contradict each other, or judging if the evidence at hand supports the conclusion being drawn? Among the examples the experts propose are these: "recognizing the factors which make a person a credible witness regarding a given event or a credible authority with regard to a given topic," "judging if an argument's conclusion follows either with certainty or with a high level of confidence from its premises," "judging the logical strength of arguments based on hypothetical situations," "judging if a given argument is relevant or applicable or has implications for the situation at hand."

Do the people you regard as strong critical thinkers have the three cognitive skills described so far? Are they good at interpretation, analysis, and evaluation? What about the next three? And your examples of weak critical thinkers, are they

lacking in these cognitive skills? All, or just some?

To the experts **inference** means "to identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to educe the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation." As sub-skills of inference the experts list querying evidence, conjecturing alternatives, and drawing conclusions. Can you think of some examples of inference? You might suggest things like seeing the implications of the position someone is advocating, or drawing out or constructing meaning from the elements in a reading. You may suggest that predicting what will happen next based what is known about the forces at work in a given situation, or formulating a synthesis of related ideas into a coherent perspective. How about this: after judging that it would be useful to you to resolve a given uncertainty, developing a workable plan to gather that information? Or, when faced with a problem, developing a set of options for addressing it. What about, conducting a controlled experiment scientifically and applying the proper statistical methods to attempt to confirm or disconfirm an empirical hypothesis?

Beyond being able to interpret, analyze, evaluate and infer, strong critical thinkers can do two more things. They can explain what they think and how they arrived at that judgment. And, they can apply their powers of critical thinking to themselves and improve on their previous opinions. These two skills are called "explanation" and "self-regulation."

The experts define **explanation** as being able to present in a cogent and coherent way the results of one's reasoning. This means to be able to give someone a full look at the big picture: both "to state and to

justify that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one's results were based; and to present one's reasoning in the form of cogent arguments." The sub-skills under explanation are describing methods and results, justifying procedures, proposing and defending with good reasons one's causal and conceptual explanations of events or points of view, and presenting full and well-reasoned, arguments in the context of seeking the best understandings possible. Your examples first, please... Here are some more: to construct a chart which organizes one's findings, to write down for future reference your current thinking on some important and complex matter, to cite the standards and contextual factors used to judge the quality of an interpretation of a text, to state research results and describe the methods and criteria used to achieve those results, to appeal to established criteria as a way of showing the reasonableness of a given judgment, to design a graphic display which accurately represents the subordinate and super-ordinate relationship among concepts or ideas, to cite the evidence that led you to accept or reject an author's position on an issue, to list the factors that were considered in assigning a final course grade.

Maybe the most remarkable cognitive skill of all, however, is this next one. This one is remarkable because it allows strong critical thinkers to improve their own thinking. In a sense this is critical thinking applied to itself. Because of that some people want to call this "meta-cognition," meaning it raises thinking to another level. But "another level" really does not fully capture it, because at that next level up what self-regulation does is look back at all the dimensions of critical thinking and double check itself. Self-regulation is like a recursive function in

mathematical terms, which means it can apply to everything, including itself. You can monitor and correct an interpretation you offered. You can examine and correct an inference you have drawn. You can review and reformulate one of your own explanations. You can even examine and correct your ability to examine and correct yourself! How? It is as simple as stepping back and saying to yourself, "How am I doing? Have I missed anything important? Let me double check before I go further."

The experts define **self-regulation** to mean "self-consciously to monitor one's cognitive activities, the elements used in those activities, and the results educed, particularly by applying skills in analysis, and evaluation to one's own inferential judgments with a view toward questioning, confirming, validating, or correcting either one's reasoning or one's results." The two sub-skills here are self-examination and self-correction. Examples? Easy — to examine your views on a controversial issue with sensitivity to the possible influences of your personal biases or self-interest, to check yourself when listening to a speaker in order to be sure you are understanding what the person is really saying without introducing your own ideas, to monitor how well you seem to be understanding or comprehending what you are reading or experiencing, to remind yourself to separate your personal opinions and assumptions from those of the author of a passage or text, to double check yourself by recalculating the figures, to vary your reading speed and method mindful of the type of material and your purpose for reading, to reconsider your interpretation or judgment in view of further analysis of the facts of the case, to revise your answers in view of the errors you discovered in your work, to change your conclusion in view of the realization that you had misjudged the importance of certain factors when coming to your earlier decision. [4]

[4] *The California Critical Thinking Skills Test*, and the *Test of Everyday Reasoning*, the Health Science Reasoning Test, the *Military and Defense Reasoning Profile*, The *Business Critical Thinking Skills Test*,

and the *Legal Studies Reasoning Profile* along with other testing instruments authored by Dr. Facione and his research team for people in K-12, college, and graduate / professional work target the

	Questions to Fire Up Our Critical Thinking Skills
Interpretation	• What does this mean? • What's happening? • How should we understand that (e.g., what he or she just said)? • What is the best way to characterize/categorize/classify this? • In this context, what was intended by saying/doing that? • How can we make sense out of this (experience, feeling, or statement)?
Analysis	• Please tell us again your reasons for making that claim. • What is your conclusion/What is it that you are claiming? • Why do you think that? • What are the arguments pro and con? • What assumptions must we make to accept that conclusion? • What is your basis for saying that?
Inference	• Given what we know so far, what conclusions can we draw? • Given what we know so far, what can we rule out? • What does this evidence imply? • If we abandoned/accepted that assumption, how would things change? • What additional information do we need to resolve this question? • If we believed these things, what would they imply for us going forward? • What are the consequences of doing things that way? • What are some alternatives we haven't yet explored? • Let's consider each option and see where it takes us. • Are there any undesirable consequences that we can and should foresee?
Evaluation	• How credible is that claim? • Why do we think we can trust what this person claims? • How strong are those arguments? • Do we have our facts right? • How confident can we be in our conclusion, given what we now know?
Explanation	• What were the specific findings/results of the investigation? • Please tell us how you conducted that analysis. • How did you come to that interpretation? • Please take us through your reasoning one more time. • Why do you think that (was the right answer/was the solution)? • How would you explain why this particular decision was made?
Self-Regulation	• Our position on this issue is still too vague; can we be more precise? • How good was our methodology, and how well did we follow it? • Is there a way we can reconcile these two apparently conflicting conclusions? • How good is our evidence? • OK, before we commit, what are we missing? • I'm finding some of our definitions a little confusing; can we revisit what we mean by certain things before making any final decisions?

Source: © 2014 User Manual for the *California Critical Thinking Skills Test*, published by Insight Assessment.

The Delphi Research Method

The panel of experts we keep referring to included forty-six men and

core critical thinking skills identified here. These instruments are published in English and several authorized translations exclusively

by Insight Assessment.

women from throughout the United States and Canada. They represented many different scholarly disciplines in the humanities, sciences, social sciences, and education. They participated in a research project that lasted two years and was conducted on behalf of the American Philosophical Association. Their work was published under the title *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*. (The California Academic Press, Millbrae, CA, 1990). You may download the executive summary of that report free. Visit

http://www.insightassessment.com

You might be wondering how such a large group of people could collaborate on this project over that long a period of time and at those distances and still come to consensus. Good question. Remember we're talking the days before e-mail.

Not only did the group have to rely on snail mail during their two-year collaboration; they also relied on a method of interaction, known as the Delphi Method, which was developed precisely to enable experts to think effectively about something over large spans of distance and time. In the Delphi Method a central investigator organizes the group and feeds them an initial question. [In this case it had to do with how college level

critical thinking should be defined so that people teaching at that level would know which skills and dispositions to cultivate in their students.] The central investigator receives all responses, summarizes them, and transmits them back to all the panelists for reactions, replies, and additional questions.

Wait a minute! These are all well-known experts, so what do you do if people disagree? And what about the possible influence of a big name person? Good points. First, the central investigator takes precautions to remove names so that the panelists are not told who said what. They know who is on the panel, of course. But that is as far as it goes. After that each experts' argument has to stand on its own merits. Second, an expert is only as good as the arguments she or he gives. So, the central investigator summarizes the arguments and lets the panelists decide if they accept them or not. When consensus appears to be at hand, the central investigator proposes this and asks if people agree. If not, then points of disagreement among the experts are registered. We want to share with you one important example of each of these. First we will describe the expert consensus view of the dispositions which are absolutely vital to strong critical thinking. Then we will note a point of separation among the experts.

Core Critical Thinking Skills		
SKILL	**Experts' Consensus Description**	**Subskill**
Interpretation	"To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria"	Categorize Decode significance Clarify meaning
Analysis	"To identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions"	Examine ideas Identify arguments Identify reasons and claims
Inference	"To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to reduce the consequences flowing from data, statements, principles, evidence, judgments,	Query evidence Conjecture alternatives Draw logically valid or justified

	beliefs, opinions, concepts, descriptions, questions, or other forms of representation"	conclusions
Evaluation	"To assess the credibility of statements or other representations that are accounts or descriptions of a person's perception, experience, situation, judgment, belief, or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions, or other forms of representation"	Assess credibility of claims Assess quality of arguments that were made using inductive or deductive reasoning
Explanation	"To state and to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one's results were based; and to present one's reasoning in the form of cogent arguments"	State results Justify procedures Present arguments
Self-Regulation	"Self-consciously to monitor one's cognitive activities, the elements used in those activities, and the results educed, particularly by applying skills in analysis, and evaluation to one's own inferential judgments with a view toward questioning, confirming, validating, or correcting either one's reasoning or one's results"	Self-monitor Self-correct

Source: APA Report: *Expert Consensus Statement on Critical Thinking*. (ERIC ED 315 423)

The Disposition Toward Critical Thinking

What kind of a person would be apt to use their critical thinking skills? The experts poetically describe such a person as having "a critical spirit." Having a critical spirit does not mean that the person is always negative and hypercritical of everyone and everything.

The experts use the metaphorical phrase **critical spirit** in a *positive* sense. By it they mean **"a probing inquisitiveness, a keenness of mind, a zealous dedication to reason, and a hunger or eagerness for reliable information."**

Almost sounds like Supreme Court Justice Sandra Day O'Connor or Sherlock Holmes The kind of person being described here is the kind that always wants to ask "Why?" or "How?" or "What happens if?". The one key difference, however, is that in fiction Sherlock always solves the mystery, while in the real world there is no guarantee. Critical thinking is about how you approach problems, questions, issues. It is the best way we know of to get to the truth. But!

There still are no guarantees — no answers in the back of the book of real life. Does this characterization, that strong critical thinkers possess a "critical spirit, a probing inquisitiveness, a keenness of mind..." fit with your examples of people you would call strong critical thinkers?

But, you might say, I know people who have skills but do not use them. We cannot call someone a strong critical thinker just because she or he has these cognitive skills, however important they might be, because what if they just do not bother to apply them?

One response is to say that it is hard to imagine an accomplished dancer who never dances. After working to develop those skills it seems such a shame to let them grow weak with lack of practice. But dancers get tired. And they surrender to the stiffness of age or the fear of injury. In the case of critical thinking skills, we might argue that not using them once you have them is hard to imagine. It's hard to imagine a person deciding not to think.

*Considered as a form of thoughtful judgment or reflective decision-making, in a very real sense critical thinking is **pervasive**.* There is hardly a time or a place where it would not seem to be of potential value. As long as people have purposes in mind and wish to judge how to accomplish them, as long as people wonder what is true and what is not, what to believe and what to reject, strong critical thinking is going to be necessary.

And yet weird things happen, so it is probably true that some people might let their thinking skills grow dull. It is easier to imagine times when people are just too tired, too lax, or too frightened. But imagine it you

can, Young Skywalker, so there has to be more to critical thinking than just the list of cognitive skills. Human beings are more than thinking machines. And this brings us back to those all-important attitudes which the experts called "dispositions."

The experts were persuaded that critical thinking is a pervasive and purposeful human phenomenon. The ideal critical thinker can be characterized not merely by her or his cognitive skills but also by how she or he approaches life and living in general. This is a bold claim. Critical thinking goes way beyond the classroom. In fact, many of the experts fear that some of the things people experience in school are actually harmful to the development and cultivation of strong critical thinking. Critical thinking came before schooling was ever invented, it lies at the very roots of civilization. It is a corner stone in the journey human kind is taking

from beastly savagery to global sensitivity. Consider what life would be like without the things on this list and we think you will understand.

The approaches to life and living which characterize critical thinking include:

* inquisitiveness with regard to a wide range of issues,
* concern to become and remain well-informed,
* alertness to opportunities to use critical thinking,
* trust in the processes of reasoned inquiry,
* self-confidence in one's own abilities to reason,
* open-mindedness regarding divergent world views,
* flexibility in considering alternatives and opinions
* understanding of the opinions of other people,
* fair-mindedness in appraising reasoning,
* honesty in facing one's own biases, prejudices, stereotypes, or egocentric tendencies,
* prudence in suspending, making or altering judgments,
* willingness to reconsider and revise views where honest reflection suggests that change is warranted.

What would someone be like who lacked those dispositions?

It might be someone who does not care about much of anything, is not interested in the facts, prefers not to think, mistrusts reasoning as a way of finding things out or solving problems, holds his or her own reasoning abilities in low esteem, is close-minded, inflexible, insensitive, cannot understand what others think, is unfair when it comes to judging the quality of arguments, denies his or her own biases, jumps to conclusions or delays too long in making judgments, and never is willing to reconsider an opinion. Not someone prudent people would want to ask to manage their investments!

The experts went beyond approaches to life and living in general to emphasize that strong critical thinkers can also be described in terms of how they approach specific issues, questions, or problems. The experts said you would find these sorts of characteristics:

* clarity in stating the question or concern,
* orderliness in working with complexity,
* diligence in seeking relevant information,
* reasonableness in selecting and applying criteria,
* care in focusing attention on the concern at hand,
* persistence though difficulties are encountered,
* precision to the degree permitted by the subject and the circumstances.

So, how would a weak critical thinker approach specific problems or issues? Obviously, by being muddle-headed about what he or she is doing, disorganized and overly simplistic, spotty about getting the facts, apt to apply unreasonable criteria, easily distracted, ready to give up at the least hint of difficulty, intent on a solution that is more detailed than is possible, or being satisfied with an overly generalized and uselessly vague response. Remind you of anyone you know?

Someone positively disposed toward using critical thinking would probably agree with statements like these:

"I hate talk shows where people shout their opinions but never give any reasons at all."
"Figuring out what people really mean by what they say is important to me."
"I always do better in jobs where I'm expected to think things out for myself."

"I hold off making decisions until I have thought through my options."
"Rather than relying on someone else's notes, I prefer to read the material myself."
"I try to see the merit in another's opinion, even if I reject it later."
"Even if a problem is tougher than I expected, I will keep working on it."
"Making intelligent decisions is more important than winning arguments."

A person **disposed to be averse or hostile toward using critical thinking** would probably disagree with the statements above but be likely to agree with these:

"I prefer jobs where the supervisor says exactly what to do and exactly how to do it."
"No matter how complex the problem, you can bet there will be a simple solution."
"I don't waste time looking things up."
"I hate when teachers discuss problems instead of just giving the answers."
"If my belief is truly sincere, evidence to the contrary is irrelevant."
"Selling an idea is like selling cars, you say whatever works."

We used the expression "strong critical thinker" to contrast with the expression "weak critical thinker." But you will find people who drop the adjective

"strong" (or "good") and just say that someone is a "critical thinker" or not. It is like saying that a soccer (European "football") player is a "defender" or "not a defender", instead of saying the player's skills at playing defense are strong or weak. People use the word "defender" in place of the phrase "is good at playing defense." Similarly, people use "critical thinker" in place of "is a strong critical thinker" or "has strong critical thinking skills." This is not only a helpful conversational shortcut, it suggests that to many people "critical thinker" has a **laudatory** sense. The word can be used to praise someone at the same time that it identifies the person, as in "Look at that play. That's what I call a defender!"

> **"If we were compelled to make a choice between these personal attributes and knowledge about the principles of logical reasoning together with some degree of technical skill in manipulating special logical processes, we should decide for the former."**
>
> John Dewey, *How We Think*, 1909. Republished as *How We Think: A Restatement of the Relation of Reflective Thinking to the Educational Process*. D. C. Heath Publishing. Lexington, MA. 1933.

We said the experts did not come to full agreement on something. That thing has to do with the concept of a "strong critical thinker." This time the emphasis is on the word "good" because of a crucial ambiguity it contains. A person can be good at critical thinking, meaning that the person can have the appropriate dispositions and be adept at the cognitive processes, while still not being a good (in the moral sense) critical thinker. For example, a person can be adept at developing arguments and then, unethically, use this skill to mislead and exploit a gullible person, perpetrate a fraud, or deliberately confuse and confound, and frustrate a project.

The experts were faced with an interesting problem. Some, a minority, would prefer to think that critical thinking, by its very nature, is inconsistent with the kinds of unethical and deliberately counterproductive examples given. They find it hard to imagine a person who was good at critical thinking not also being good in the broader personal and social sense. In other words, if a person were "really" a "strong critical thinker" in the procedural sense and if the person had all the appropriate dispositions, then the person simply would not do those kinds of exploitive and aggravating things.

Critical Thinking Mindset Self-Rating Form

Answer yes or no to each. Can I *name any specific instances over the past two days* when I:

1 was courageous enough to ask tough questions about some of my longest held and most cherished beliefs?

2 backed away from questions that might undercut some of my longest held and most cherished beliefs?

3 showed tolerance toward the beliefs, ideas, or opinions of someone with whom I disagreed?

4 tried to find information to build up my side of an argument but not the other side?

5 tried to think ahead and anticipate the consequences of various options?

6 laughed at what other people said and made fun of their beliefs, values, opinion, or points of views?

7 made a serious effort to be analytical about the foreseeable outcomes of my decisions?

8 manipulated information to suit my own purposes?

9 encouraged peers not to dismiss out of hand the opinions and ideas other people offered?

10 acted with disregard for the possible adverse consequences of my choices?

11 organized for myself a thoughtfully systematic approach to a question or issue?

12 jumped in and tried to solve a problem without first thinking about how to approach it?

13 approached a challenging problem with confidence that I could think it through?

14 instead of working through a question for myself, took the easy way out and asked someone else for the answer?

15 read a report, newspaper, or book chapter or watched the world news or a documentary just to learn something new?

16 put zero effort into learning something new until I saw the immediate utility in doing so?

17 showed how strong I was by being willing to honestly reconsider a decision?

18 showed how strong I was by refusing to change my mind?

19 attended to variations in circumstances, contexts, and situations in coming to a decision?

20 refused to reconsider my position on an issue in light of differences in context, situations, or circumstances?

If you have described yourself honestly, this self-rating form can offer a rough estimate of what you think your overall disposition toward critical thinking has been in the past two days.

Give yourself 5 points for every "Yes" on odd numbered items and for every "No" on even numbered items. If your total is 70 or above, you are rating your disposition toward critical thinking over the past two days as generally positive. Scores of 50 or lower indicate a self-rating that is averse or hostile toward critical thinking over the past two days. Scores between 50 and 70 show that you would rate yourself as displaying an ambivalent or mixed overall disposition toward critical thinking over the past two days.

Interpret results on this tool cautiously. At best this tool offers only a rough approximation with regard to a brief moment in time. Other tools are more refined, such as the *California Critical Thinking Disposition Inventory*, which gives results for each of the seven critical thinking habits of mind.

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For a fuller and more robust measure of critical thinking dispositions see the California Critical Thinking Disposition Inventory (CCTDI) by Facione and Facione, published in 1992, by Insight Assessment.

The large majority, however, hold the opposite judgment. They are firm in the view that strong critical thinking has nothing to do with any given set of cultural beliefs, religious tenets, ethical values, social mores, political orientations, or orthodoxies of any kind. Rather, the commitment one makes as a strong critical thinker is to always seek the truth with objectivity, integrity, and fair-mindedness. The majority of experts maintain that critical thinking conceived of as we have described it above, is, regrettably, not inconsistent with abusing one's knowledge, skills, or power. There have been people with superior thinking skills and strong habits of mind who, unfortunately, have used their talents for ruthless, horrific, and immoral purposes. Would that it were not so! Would that experience, knowledge, mental horsepower, and ethical virtue were all one and the same. But from the time of Socrates, if not thousands of years before that, humans have known that many of us have one or more of these without having the full set.

Any tool, any approach to situations, can go either way, ethically speaking, depending on the character, integrity, and principles of the persons who possess them. So, in the final analysis the majority of experts maintained that we cannot say a person is not thinking critically simply because we disapprove ethically of what the person is doing. The majority concluded that, "what 'critical thinking' means, why it is of value, and the ethics of its use are best regarded as three distinct concerns."

Perhaps this realization forms part of the basis for why people these days are demanding a broader range of learning outcomes from our schools and colleges. "Knowledge and skills," the staples of the educational philosophy of the mid-twentieth century, are not sufficient. We must look to a broader set of outcomes including habits of mind and dispositions, such as civic engagement, concern for the common good, and social responsibility.

"Thinking" in Popular Culture

We have said so many good things about *critical thinking* that you might have the impression that "critical thinking" and "good thinking" mean the same thing. But that is not what the experts said. They see critical thinking as making up part of what we mean by good thinking, but not as being the only kind of good thinking. For example, they would have included creative thinking as part of good thinking.

Creative or *innovative thinking* is the kind of thinking that leads to new insights, novel approaches, fresh perspectives, whole new ways of understanding and conceiving of things. The products of creative thought include some obvious things like music, poetry, dance, dramatic literature, inventions, and technical innovations. But there are some not so obvious examples as well, such as ways of putting a question that expand the horizons of possible solutions, or ways of conceiving of relationships which challenge presuppositions and lead one to see the world in imaginative and different ways.

The experts working on the concept of critical thinking wisely left open the entire question of what the other forms good thinking might take. Creative thinking is only one example. There is a kind of *purposive, kinetic thinking* that instantly coordinates movement and intention as, for example, when an athlete dribbles a soccer ball down the field during a match. There is a kind of *meditative thinking* which may lead to a sense of inner peace or to profound insights about human existence. In contrast, there is a kind of *hyper-alert, instinctive thinking* needed by soldiers in battle. In the context of popular culture one finds people proposing all kinds of thinking or this-kind of intelligence or that-kind of intelligence. Some times it is hard to sort out the science from the pseudo-science – the kernel of enduring truth from the latest cocktail party banter.

Two Parallel-Functioning, Rational, Decision Making Systems

SYSTEM 1

Renders quick, holistic associational, judgments.

Automatic, well-trained, reactive.

Can block out or derive support from system 2.

SYSTEM 2

Renders considered, criterion-based, judgments.

Reflective, reasoned, systematic.

Can bolster or over-ride system 1.

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"Thinking" in Cognitive Science

Theories emerging from more scientific studies of human thinking and decision-making in recent years propose that thinking is more integrated and less dualistic than the notions in popular culture suggest. We should be cautious about proposals suggesting oversimplified ways of understanding how humans think. We should avoid harsh, rigid dichotomies such as "reason vs. emotion," "intuitive vs. linear," "creativity vs. criticality," "right brained vs. left brained," "as on Mars vs. as on Venus."

There is often a kernel of wisdom in popular beliefs, and perhaps that gem this time is the realization that some times we decide things very quickly almost as spontaneous, intuitive, reactions to the situation at hand. Many accidents on the freeways of this nation are avoided precisely because drivers are able to see and react to dangerous situations so quickly. Many good decisions which feel intuitive are really the fruit of expertise. Decisions good drivers make in those moments of crisis, just like the decisions which practiced athletes make in the flow of a game or the decisions that a gifted teacher makes as she or he interacts with students, are borne of expertise, training, and practice.

At the same time that we are immersed in the world around us and in our daily lives, constantly making decisions unreflectively, we may also be thinking quite reflectively about something. Perhaps we're worried about a decision which we have to

make about an important project at work, or about a personal relationship, or about a legal matter, whatever. We gather information, consider our options, explore possibilities, formulate some thoughts about what we propose to do and why this choice is the right one. In other words, we make a purposeful, reflective judgment about what to believe or what to do – precisely the kind of judgment which is the focus of critical thinking.

Recent integrative models of human decision-making propose that the thinking processes of our species is not best described as a conflictive duality as in "intuitive vs. reflective" but rather an integrative functioning of two mutually supportive systems "intuitive and reflective." These two systems of thinking are present in all of us and can act in parallel to process cognitively the matters over which we are deciding.

One system is more intuitive, reactive, quick and holistic. So as not to confuse things with the notions of thinking in popular culture, cognitive scientists often name this system, "System 1." The other (yes, you can guess its name) is more deliberative, reflective, computational and rule governed. You are right, it is called "System 2."

In **System 1** thinking, one relies heavily on a number of heuristics (cognitive maneuvers), key situational characteristics, readily associated ideas, and vivid memories to arrive quickly and confidently at a judgment. System 1 thinking is particularly helpful in familiar situations when time is short and immediate action is required.

While System 1 is functioning, another powerful system is also at work, that is, unless we shut it down by abusing alcohol or drugs, or with fear or indifference. Called "**System 2**," this is our more reflective thinking system. It is useful for making judgments when you find yourself in unfamiliar situations and have more time to figure things out. It allows us to process abstract concepts, to deliberate, to plan ahead, to consider options carefully, to review and revise our work in the light of relevant guidelines or standards or rules of procedure. While System 2 decisions are also influenced by the correct or incorrect application of heuristic maneuvers, this is the system which relies on well articulated reasons and more fully developed evidence. It is reasoning based on what we have learned through careful analysis, evaluation, explanation, and self-correction. This is the system which values intellectual honesty, analytically anticipating what happens next, maturity of judgment, fair-mindedness, elimination of biases, and truth-seeking. This is the system which we rely on to think carefully trough complex, novel, high-stakes, and highly integrative problems.[5]

Educators urge us to improve our critical thinking skills and to reinforce our disposition to use those skills because that is perhaps the best way to develop and refine our System 2 reasoning.

System 1 and System 2 are both believed to be vital decision-making tools when stakes are high and when uncertainty is an issue. Each of these two cognitive systems are believed to be capable of functioning to monitor and potentially override the other. This is one of the ways our species reduces the chance of making foolish, sub-optimal or even dangerous

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[5] Chapters 10 and 11 of *Think Critically*, Pearson Education, locate critical thinking within this integrative model of thinking. The cognitive heuristics, which will be described next, and the human capacity to derive sustained confidence decisions (right or wrong),-- known as "dominance structuring," – are presented there too. There are lots of useful exercises and examples in that book. You

may also wish to consult the references listed at the end of this essay. The material presented in this section is derived from these books and related publications by many of these same authors and others working to scientifically explain how humans actually make decisions.

errors in judgment. Human thinking is far from perfect. Even a good thinker makes both System 1 and 2 errors. At times we misinterpret things, or we get our facts wrong, and we make mistakes as a result. But often our errors are directly related to the influences and misapplications of *cognitive heuristics.* Because we share the propensity to use these heuristics as we make decisions, let's examine how some of them influence us.

Thomas Jefferson

"Fix reason firmly in her seat, and call to her tribunal every fact, every opinion. Question with boldness even the existence of a God; because, if there be one, he must more approve of the homage of reason, than that of blindfolded fear."

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Cognitive heuristics are thinking maneuvers which, at times, appear to be almost hardwired into our species. They influence both systems of thinking, the intuitive thinking of System 1 and the reflective reasoning of System 2. Five heuristics often seem to be more frequently operating in our System 1 reasoning are known as *availability, affect, association, simulation, and similarity*.

Availability, the coming to mind of a story or vivid memory of something that happened to you or to someone close to you, inclines a person make inaccurate estimates of the likelihood of that thing's happening again. People tell stories of things that happened to themselves or their friends all the time as a way of explaining their own decisions. The stories may not be scientifically representative, the events may be mistaken, misunderstood, or misinterpreted. But all that aside, the power

of the story is to guide, often in a good way, the decision toward one choice rather than another.

The **Affect** heuristic operates when you have an immediate positive or an negative reaction to some idea, proposal, person, object, whatever. Sometimes called a "gut reaction" this affective response sets up an initial orientation in us, positive or negative, toward the object. It takes a lot of System 2 reasoning to overcome a powerful affective response to an idea, but it can be done. And at times it should be, because there is no guarantee that your gut reaction is always right.

The **Association** heuristic is operating when one word or idea reminds us of something else. For example, some people associate the word "cancer" with "death." Some associate "sunshine" with "happiness." These kinds of associational reasoning responses can be helpful at times, as for example if associating cancer with death leads you not to smoke and to go in for regular checkups. At other times the same association may influence a person to make an unwise decision, as for example if associating "cancer" with "death" were to lead you to be so fearful and pessimistic that you do not seek diagnosis and treatment of a worrisome cancer symptom until it was really too late to do anything.

The **Simulation** heuristic is working when you are imagining how various scenarios will unfold. People often imagine how a conversation will go, or how they will be treated by someone else when they meet the person, or what their friends or boss or lover will say and do when they have to address some difficult issue. These simulations, like movies in our heads, help us prepare and do a better job when the difficult moment arrives. But they can also lead us to have mistaken expectations. People may not respond as we imagined, things may go much differently. Our preparations may fail us because the ease of our simulation misled

us into thinking that things would have to go as we had imagined them. And they did not.

we focus on might be fundamental and relevant, which would make the inference more warranted. For example, the boss fired your coworker for missing sales targets and you draw the reasonable conclusion that if you miss your sales targets you'll be fired too. Or the similarity that comes to mind

CRITICAL THINKING SKILLS MAP ON TO LEADERSHIP DECISION MAKING

Successful professionals with leadership responsibilities, like those in business or the military, apply all their critical thinking skills to solve problems and to make sound decisions. At the risk of oversimplifying all the ways that our critical thinking intersects with problem solving and leadership decision making, here are some of the more obvious connecting points:

- Identify Critical Elements
  - ◦ Analyze the strategic environment, identify its elements and their relationships
  - ◦ Interpret events and other elements in the strategic environment for signs of risk, opportunity, weakness, advantage
- Project Logical Consequences
  - ◦ Infer, given what is known with precision and accuracy within the strategic environment, the logical and most predictable consequences of various courses of action
- Navigate Risk and Uncertainty
  - ◦ Infer, given the range of uncertainty and risk in the strategic environment, the full range of the possible and probable consequences of each possible course of action
- Assess Decision Options
  - ◦ Evaluate anticipated results for positive and negative impacts
  - ◦ Evaluate risks, opportunities, options, consequences
  - ◦ Explain the rationale (evidence, methodology, criteria, theoretical assumptions, and context) for deciding on the integrated strategic objectives and for the planning and action parameters that compose the strategy
  - ◦ Double Check Everything: At every step review one's own thinking and make necessary corrections.

The **Similarity** heuristic operates when we notice some way in which we are like someone else and infer that what happened to that person is therefore more likely to happen to us. The similarity heuristic functions much like an analogical argument or metaphorical model. The similarity

might be superficial or not connected with the outcome, which would make the inference unwarranted. For example you see a TV commercial showing trim-figured young people enjoying fattening fast foods and infer that because you're young too you can indulge your cravings for fast foods without gaining a lot of excess unsightly poundage.

Heuristics and biases often appearing to be somewhat more associated with System 2 thinking include: *satisficing, risk/loss aversion, anchoring with adjustment, and the illusion of control.*

Satisficing occurs as we consider our alternatives. When we come to one which is good enough to fulfill our objectives we often regard ourselves as having completed our deliberations. We have satisficed. And why not? The choice is, after all, good enough. It may not be perfect, it may not be optimal, it may not even be the best among the options available. But it is good enough. Time to decide and move forward.

The running mate of satisficing is temporizing. Temporizing is deciding that the option which we have come to is "good enough for now." We often move through life satisficing and temporizing. At times we look back on our situations and wonder why it is that we have settled for far less than we might have. If we had only studied harder, worked out a little more, taken better care of ourselves and our relationships, perhaps we would not be living as we are now. But, at the time each of the decisions along the way was "good enough for the time being."

We are by nature a species that is **averse to risk and loss**. Often we make decisions on the basis of what we are too worried about losing, rather than on the basis of what we might gain. This works out to be a rather serviceable approach in many circumstances. People do not want to lose control, they do not want to lose their freedom, they do not want to lose their lives, their families, their jobs, their possessions. High stakes gambling is best left to those who can afford to lose the money. Las Vegas didn't build all those multi-million dollar casino hotels because vacationers are winning all the time! And so, in real life, we take precautions. We avoid unnecessary risks. The odds may not be stacked against us, but the consequences of losing at times

are so great that we would prefer to forego the possibilities of gain in order not to lose what we have. And yet, on occasion this can be a most unfortunate decision too. History has shown time and time again that businesses which avoid risks often are unable to compete successfully with those willing to move more boldly into new markets or into new product lines.

Any heuristic is only a maneuver, perhaps a shortcut or impulse to think or act in one way rather than another, but certainly not a failsafe rule. It may work out well much of the time to rely on the heuristic, but it will not work out for the best all of the time.

For example, people with something to lose tend toward conservative choices politically as well as economically. Nothing wrong with that necessarily. Just an observation about the influence of Loss Aversion heuristic on actual decision making. We are more apt to endure the status quo, even as it slowly deteriorates, than we are to call for "radical" change. Regrettably, however, when the call for change comes, it often requires a far greater upheaval to make the necessary transformations, or, on occasion, the situation has deteriorated beyond the point of no return. In those situations we find ourselves wondering why we waited so long before doing something.

The heuristic known as **Anchoring with Adjustment** is operative when we find ourselves making evaluative judgments. The natural thing for us to do is to locate or anchor our evaluation at some point along whatever scale we are using. For example, a professor says that the student's paper is a C+. Then, as other information comes our way, we may adjust that judgment. The professor, for example, may decide that the paper is as good as some others that were given a B-, and so adjust the grade upward. The interesting thing about this heuristic, is that we do not normally start over with a fresh evaluation. We have dropped anchor and we may drag it upward or downward a bit, but

we do not pull it off the bottom of the sea to relocate our evaluation. First impressions, as the saying goes, cannot be undone. The good thing about this heuristic is that it permits us to move on. We have done the evaluation; there are other papers to grade, other projects to do, other things in life that need attention. We could not long endure if we had to constantly re-evaluate every thing anew. The unfortunate thing about this heuristic is that we sometimes drop anchor in the wrong place; we have a hard time giving people a second chance at making a good first impression.

The heuristic known as **Illusion of Control** is evident in many situations. Many of us over-estimate our abilities to control what will happen. We make plans for how we are going to do this or that, say this or that, manipulate the situation this way or that way, share or not share this information or that possibility, all the time thinking that some how our petty plans will enable us to control what happens. We act as if others are dancing on the ends of the strings that we are pulling, when in actuality the influences our words or actions have on future events may be quite negligible. At times we do have some measure of control. For example we may exercise, not smoke, and watch our diet in order to be more fit and healthy. We are careful not to drink if we are planning to drive so that we reduce the risks of being involved in a traffic accident. But at times we simply are mistaken about our ability to actually exercise full control over a situation. Sadly we might become ill even if we do work hard to take good care of ourselves. Or we may be involved in an accident even if we are sober. Our business may fail even if we work very hard to make it a success. We may not do as well on an exam as we might hope even if we study hard.

Related to the Illusion of Control heuristic is the tendency to misconstrue our personal influence or responsibility for past events. This is called **Hindsight Bias.** We may over-estimate the influence our actions have had on events when things go right, or

we may underestimate our responsibility or culpability when things go wrong. We have all heard people bragging about how they did this and how they did that and, as a result, such and such wonderful things happened. We made these great plans and look how well our business did financially. Which may be true when the economy is strong; but not when the economy is failing. It is not clear how much of that success came from the planning and how much came from the general business environment. Or, we have all been in the room when it was time to own up for some thing that went wrong and thought to ourselves, hey, I may have had some part in this, but it was not entirely my fault. "It wasn't my fault the children were late for school, hey I was dressed and ready to go at the regular time." As if seeing that the family was running late I had no responsibility to take some initiative and help out.

"Insanity is doing the same thing over and over again while expecting a different outcome."

Albert Einstein

Research on our shared heuristic patterns of decision-making does not aim to evaluate these patterns as necessarily good or bad patterns of thinking. I fear that my wording of them above may not have been as entirely neutral and descriptive as perhaps it should have been. In truth, reliance on heuristics can be an efficient ways of deciding things, given how very complicated our lives are. We cannot devote maximal cognitive resources to every single decision we make.

Those of us who study these heuristic thinking phenomena are simply trying to document how we humans *do* think. There are many useful purposes for doing this. For example, if we find that people repeatedly make a given kind of mistake when thinking about a commonly experienced problem,

then we might find ways to intervene and to help ourselves not repeat that error over and over again.

This research on the actual patterns of thinking used by individuals and by groups might prove particularly valuable to those who seek interventions which could improve how we make our own heath care decisions, how we make business decisions, how we lead teams of people to work more effectively in collaborative settings, and the like.

Popular culture offers one other myth about decision-making which is worth questioning. And that is the belief that when we make reflective decisions we carefully weigh each of our options, giving due consideration to all of them in turn, before deciding which we will adopt. Although perhaps it should be, research on human decision-making shows that this simply is not what happens.[6] When seeking to explain how people decide on an option with such conviction that they stick to their decision over time and with such confidence that they act on that decision, the concept that what we do is build a **Dominance Structure** has been put forth. In a nutshell this theory suggests that when we settle on a particular option which is good enough we tend to elevate its merits and diminish its flaws relative to the other options. We raise it up in our minds until it becomes for us the dominant option. In this way, as our decision takes shape, we gain confidence in our choice and we feel justified in dismissing the other options, even though the objective distance between any of them and our dominant option may not be very great at all. But we become invested in our dominant option to the extent that we are able to put the other possibilities aside and act on the basis of our choice. In fact, it comes to dominate the other options in our minds so much that we are able to sustain our decision

to act over a period of time, rather than going back to re-evaluate or reconsider constantly. Understanding the natural phenomenon of dominance structuring can help us appreciate why it can be so difficult for us to get others to change their minds, or why it seems that our reasons for our decisions are so much better than any of the objections which others might make to our decisions. This is not to say that we are right or wrong. Rather, this is only to observe that human beings are capable of unconsciously building up defenses around their choices which can result in the warranted or unwarranted confidence to act on the basis of those choices.

Realizing the power of dominance structuring, one can only be more committed to the importance of education and critical thinking. We should do all that we can to inform ourselves fully and to reflect carefully on our choices before we make them, because we are, after all, human and we are as likely as the next person to believe that we are right and they are wrong once the dominance structure begins to be erected. Breaking through that to fix bad decisions, which is possible, can be much harder than getting things right in the first place.

There are more heuristics than only those mentioned above. There is more to learn about dominance structuring as it occurs in groups as well as in individuals, and how to mitigate the problems which may arise by prematurely settling on a "good enough" option, or about how to craft educational programs or interventions which help people be more effective in their System 1 and System 2 thinking. There is much to learn about human thinking and how to optimize it in individuals of different ages; how to optimize the thinking of groups of peers and groups where organizational hierarchies influence interpersonal

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[6] Henry Montgomery, "From cognition to action: The search for dominance in decision making." In *Process and Structure in Human Decision-Making*, Montgomery H, Svenson O (Eds). John Wiley &

Sons: Chichester, UK, 1989. For a more accessible description along with reflective exercises on how to avoid becoming "locked in" to a poor decision prematurely, see chapter 11 of *Think Critically*.

dynamics. And, happily, there is a lot we know today about human thinking and decision-making that we did not know a few years ago.

Why critical thinking?

Let us start with you first. Why would critical thinking be of value to you to have the cognitive skills of interpretation, analysis, evaluation, inference, explanation, and self-regulation?

Apart from, or maybe in light of, what we said at the beginning of this essay about the utility of positive critical thinking and about the problems that failures of critical thinking contribute to, why would it be of value to you to learn to approach life and to approach specific concerns with the critical thinking dispositions listed above? Would you have greater success in your work? Would you get better grades?

Actually the answer to the grades question, scientifically speaking, is very possibly, Yes! A study of over 1100 college students shows that scores on a college level critical thinking skills test significantly correlated with college GPA.[7] It has also been shown that critical thinking skills can be learned, which suggests that as one learns them one's GPA might well improve. In further support of this hypothesis is the significant correlation between critical thinking and reading comprehension. Improvements in the one are paralleled by improvements in the other. Now if you can read better and think better, might you not do better in your classes, learn more, and get better grades. It is, to say the least, very plausible.

Learning, Critical Thinking, and Our Nation's Future

But what a limited benefit — better grades. Who really cares in the long run? Two years after college, five years out, what does GPA really mean? Right now college level technical and professional programs have a half-life of about four years, which means that the technical content is expanding so fast and changing so much that in about four years after graduation your professional training will be in serious need of renewal. So, if the only thing a college is good for is to get the entry level training and the credential needed for some job, then college would be a time-limited value.

"Critical Thinking" - Working Consensus

Purposeful, reflective judgment which manifests itself in reasoned consideration of evidence, context, methods, standards, and conceptualizations in deciding what to believe or what to do.

The Delphi Report: Executive Summary: (1990), The California Academic Press, or ERIC Doc ED315 423

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The APA Delphi Report, Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction 1990 ERIC Doc. NO.: ED 315 423

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[7] Findings regarding the effectiveness of critical thinking instruction, and correlations with GPA and reading ability are reported in "Technical Report #1, Experimental Validation and Content Validity" (ERIC ED 327 549), "Technical Report #2, Factors Predictive of CT Skills" (ERIC ED 327 550), and "Gender, Ethnicity, Major, CT Self-Esteem, and the California Critical Thinking Skills Test" (ERIC ED 326 584). These findings remain consistent in research using the tools in the *California Critical Thinking Skills Test* family of instruments published by Insight Assessment.

Is that the whole story? A job is a good thing, but is that what a college education is all about, getting started in a good job? Maybe some cannot see its further value, but many do. A main purpose, if not *the* main purpose, of the collegiate experience, at either the two-year or the four-year level, is to achieve what people have called a "liberal education." Not liberal in the sense of a smattering of this and that for no particular purpose except to fulfill the unit requirement. But liberal in the sense of "liberating." And who is being liberated? You! Liberated from a kind of slavery. But from whom?

From professors. Actually from dependence on professors so that they no longer stand as infallible authorities delivering opinions beyond our capacity to challenge, question, and dissent. In fact, this is exactly what the professors want. They want their students to excel on their own, to go beyond what is currently known, to make their own contributions to knowledge and to society. [Being a professor is a curious job — the more effective you are as a teacher, less your students require your aid in learning.]

Liberal education is about learning to learn, which means learning to think for yourself on your own and in collaboration with others.

Liberal education leads us away from naive acceptance of authority, above self-defeating relativism, and beyond ambiguous contextualism. It culminates in principled reflective judgment. Learning critical thinking, cultivating the critical spirit, is not just a means to this end, it is part of the goal itself. People who are weak critical thinkers, who lack the dispositions and skills described, cannot be said to be liberally educated, regardless of the academic degrees they may hold.

Yes, there is much more to a liberal education, than critical thinking. There is an understanding of the methods, principles, theories and ways of achieving knowledge which are proper to the different intellectual realms. There is an encounter with the cultural, artistic and spiritual dimensions of life. There is the evolution of one's decision making to the level of principled integrity and concern for the common good and social justice. There is the realization of the ways all our lives are shaped by global as well as local political, social, psychological, economic, environmental, and physical forces. There is the growth that comes from the interaction with cultures, languages, ethnic groups, religions, nationalities, and social classes other than one's own. There is the refinement of one's humane sensibilities through reflection on the recurring questions of human existence, meaning, love, life and death. There is the sensitivity, appreciation and critical appraisal of all that is good and all that is bad in the human condition. As the mind awakens and matures, and the proper nurturing and educational nourishment is provided, these others central parts of a liberal education develop as well. Critical thinking plays an essential role in achieving these purposes.

Anything else? What about going beyond the individual to the community?

The experts say critical thinking is fundamental to, if not essential for, "a rational and democratic society." What might the experts mean by this?

Well, how wise would democracy be if people abandoned critical thinking? Imagine an electorate that cared not for the facts, that did not wish to consider the pros and cons of the issues, or if they did, had not the brain power to do so. Imagine your life and the lives of your friends and family placed in the hands of juries and judges who let their biases and stereotypes govern their decisions, who do not attend to the evidence, who are not interested in reasoned inquiry, who do not know how to draw an inference or evaluate one. Without critical thinking

people would be more easily exploited not only politically but economically. The impact of abandoning critical thinking would not be confined to the micro-economics of the household checking account. Suppose the people involved in international commerce were lacking in critical thinking skills, they would be unable to analyze and interpret the market trends, evaluate the implications of interest fluctuations, or explain the potential impact of those factors which influence large scale production and distribution of goods and materials. Suppose these people were unable to draw the proper inferences from the economic facts, or unable to properly evaluate the claims made by the unscrupulous and misinformed. In such a situation serious economic mistakes would be made. Whole sectors of the economy would become unpredictable and large scale economic disaster would become extremely likely. So, given a society that does not value and cultivate critical thinking, we might reasonably expect that in time the judicial system and the economic system would collapse. And, in such a society, one that does not liberate its citizens by teaching them to think critically for themselves, it would be madness to advocate democratic forms of government.

> *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.*

Is it any wonder that business and civic leaders are maybe even more interested in critical thinking than educators? Critical thinking employed by an informed citizenry is a necessary condition for the success of democratic institutions and for competitive free-market economic enterprise. These values are so important that it is in the national interest that we should try to educate all citizens so that they can learn to think critically. Not just for their personal good, but for the good of the rest of us too.

Generalizing, imagine a society, say, for example, the millions of people living in the Los Angeles basin, or in New York and along the east coast, or in Chicago, or Mexico City, Cairo, Rome, Tokyo, Baghdad, Moscow, Beijing, or Hong Kong. They are, de facto, entirely dependent upon one another, and on hundreds of thousands of other people as well for their external supplies of food and water, for their survival. Now imagine that these millions permitted their schools and colleges to stop teaching people how to think critically and effectively. Imagine that because of war, or AIDS, or famine, or religious conviction, parents could not or would not teach their children how to think critically. Imagine the social and political strife, the falling apart of fundamental systems of public safety and public health, the loss of any scientific understanding of disease control or agricultural productivity, the emergence of paramilitary gangs, strong men, and petty warlords seeking to protect themselves and their own by acquiring control over what food and resources they can and destroying those who stand in their path.

Look at what has happened around the world in places devastated by economic embargoes, one-sided warfare, or the HIV/AIDS epidemic. Or, consider the problem of global climate change, and how important it is for all of us to cooperate with efforts to curtail our uses of fossil fuels in order to reduce emissions of harmful greenhouse gases.
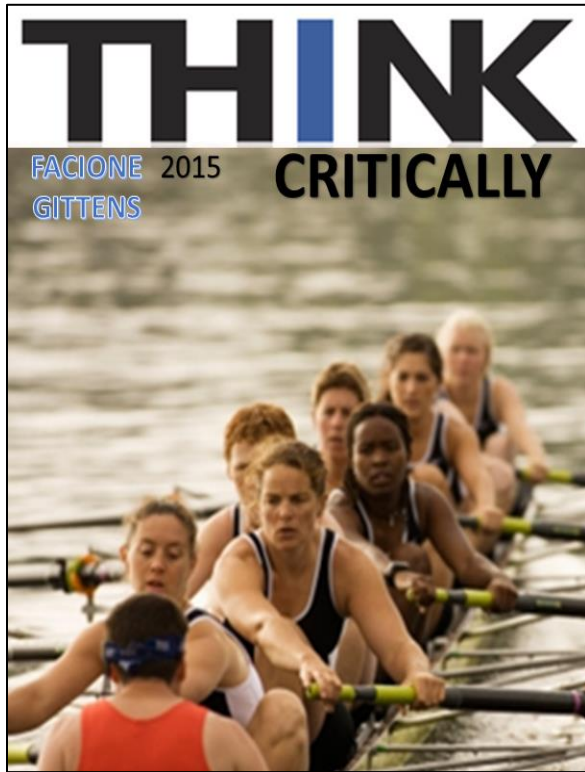
Consider the "cultural revolutions" undertaken by totalitarian rulers. Notice how in virtually every case absolutist and dictatorial despots seek ever more severe limitations on free expression. They label "liberal" intellectuals "dangers to society" and expel "radical" professors from teaching posts because they might "corrupt the youth." Some use the power of their governmental or religious authority to crush not only their opposition but the moderates as well -- all in the name of maintaining the purity of their movement. They intimidate journalists and those media outlets which dare to comment "negatively" on their political and cultural goals or their heavy handed methods.

The historical evidence is there for us to see what happens when schools are closed or converted from places of education to places for indoctrination. We know what happens when children are no longer being taught truth-seeking, the skills of good reasoning, or the lessons of human history and basic science: Cultures disintegrate;

communities collapse; the machinery of civilization fails; massive numbers of people die; and sooner or later social and political chaos ensues.

Or, imagine a media, a religious or political hegemony which cultivated, instead of critical thinking, all the opposite dispositions? Or consider if that hegemony reinforced uncritical, impulsive decision making and the "ready-shoot-aim" approach to executive action. Imagine governmental structures, administrators, and community leaders who, instead of encouraging critical thinking, were content to make knowingly irrational, illogical, prejudicial, unreflective, short-sighted, and unreasonable decisions.

How long might it take for the people in this society which does not value critical thinking to be at serious risk of foolishly harming themselves and each other?

The news too often reports about hate groups, wanton shooting, terrorists and violently extreme religious zealots. Education which includes a good measure of critical thinking skills and dispositions like truth-seeking and open-mindedness, is a problem for terrorists and extremists of every stripe because terrorists and extremists want to control of what people think. They are ideologists of the worst kind. Their methods include indoctrination, intimidation, and the strictest authoritarian orthodoxy. In the "black-and-white" world of "us vs. them" a good education would mean that the people might begin to think for themselves. And that is something these extremists do not want.

History shows that assaults on learning, whether by book burning, exile of intellectuals, or regulations aimed at suppressing research and frustrating the fair-minded, evidence-based, and unfettered pursuit of knowledge, can happen wherever and whenever people are not vigilant defenders of open, objective, and independent inquiry.

Does this mean that society should place a very high value on critical thinking?

Absolutely!

Does this mean society has the right to force someone to learn to think critically?

Maybe. But, really, should we have to?

I D E A S

A 5-Step Critical Thinking General Problem Solving Process

I = IDENTIFY the Problem and Set Priorities (Step 1)

D = DETERMINE Relevant Information and Deepen Understanding (Step 2)

E = ENUMERATE Options and Anticipate Consequence (Step 3)

A = ASSESS the Situation and Make a Preliminary Decision (Step 4)

S = SCRUTINIZE the Process and Self-Correct as Needed (Step 5)

EXPERT CONSENSUS STATEMENT REGARDING CRITICAL THINKING AND THE IDEAL CRITICAL THINKER

"We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating strong critical thinkers means working toward this ideal. It combines developing CT skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society."

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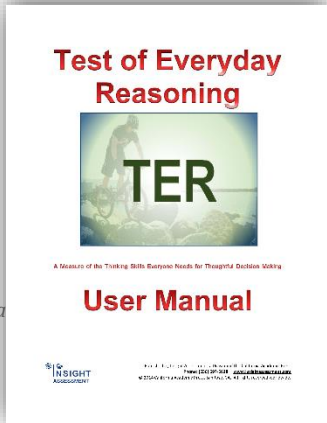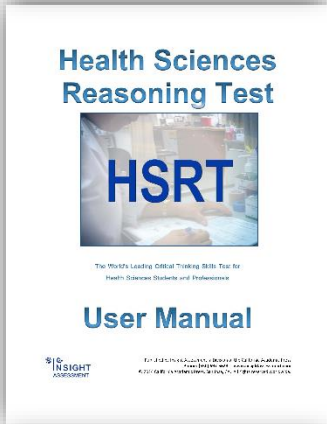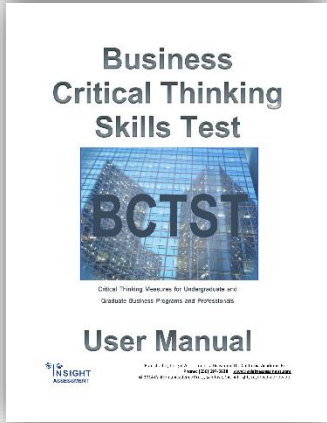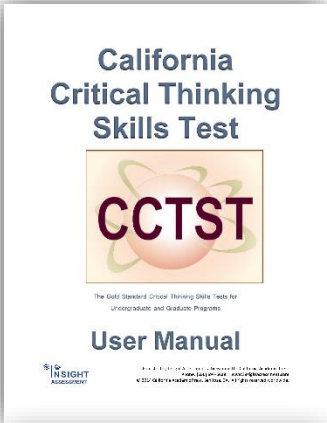
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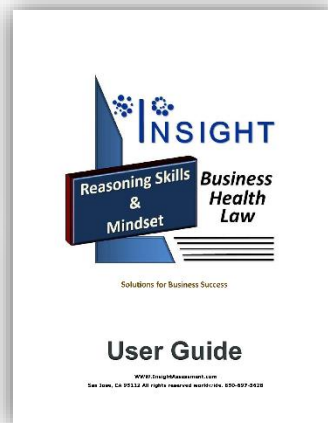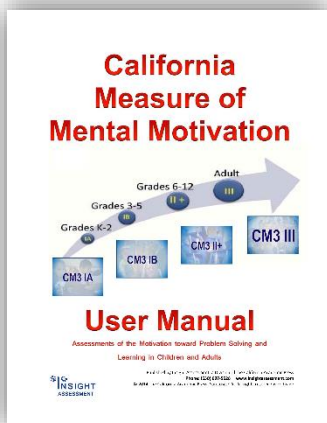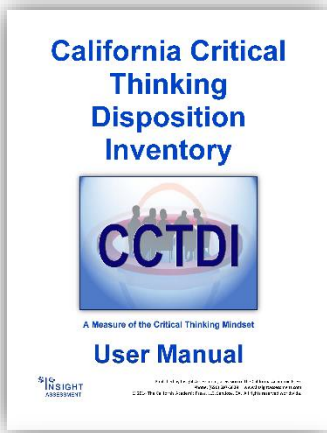

"Critical Thinking for Life: Valuing, Measuring, and Training Critical Thinking in All its Forms," describes the work of Drs. Peter A. and Noreen C. Facione. The essay can be found in the Spring 2013 issue of *Inquiry (Vol. XXVIII, No.1).*

They and their co-investigators have been engaged in research and teaching about reasoning, decision-making, and effective individual and group thinking processes since 1967. Over the years they developed instruments to measure the core skills and habits of mind of effective thinking, these instruments are now in use in many different languages throughout the world. Since 1992 they have presented hundreds of workshops about effective teaching for thinking and about leadership, decision-making, leadership development, planning and budgeting, and learning outcomes assessment at national and international professional association meetings, business organizations, military bases, healthcare agencies, and on college and university throughout the nation.

Bios can be found at www.measuredreasons.com. Email the author at pfacione@measuredreasons.com.

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