

X16 – EXchanging Worldviews, 16:
EXploring Prospects for Peace & Prosperity, 8:
EXtricating Humanity from EXcruciating Problems by, 2:
EXtolling Critical/Scientific/Evaluative Thinking

Dear: Once upon a time, a long, long time ago, a certain trouble-making grandchild asked me why I don't believe in god. I've been trying to explain that belief in god is bad science and even worse policy. In these X-chapters, in particular, I've been trying to show that belief in god hinders progress toward worldwide peace and prosperity. Toward suggesting how to overcome such hindrance, I've argued (unoriginally) that the most important step is to expand "good education" – especially for kids, since as you no doubt know, most adults are pretty much a lost cause (☹). As for the most important emphasis in "good education", I've argued (again, unoriginally) that rather than trying to cram generalities into kids' heads (e.g., their parent's religion or their society's philosophy), educators should expose kids to particulars – and guide them to extract lessons from their own experiences (as Schopenhauer recommended).

In this chapter, as a part of explaining what I mean by "good education" (for all children, throughout the world), I want to explain why I advocate the expansion of "evaluative-thinking skills" (or "scientific-thinking skills" or "critical-thinking skills" or just "thinking skills"). In summary, the reason is simply that, when they become adults, they'll be able to use such thinking skills to identify and reject clearly invented balderdash. Thereby, they'll be able to begin to break humanity free from the previously-described Catch-22 sprung on gullible people by the clerics of the world, arrest and begin to exterminate the previously-described god memes ("parasitic mental processes... the cultural equivalents of computer viruses"), and foster the expansion of more peace and prosperity, everywhere.

As for my meaning for "good education", in more detail, it contains two fundamental and inseparable components: experiences and extrapolations – but not just any experiences and not just any extrapolations. In John Dewey's statement that I quoted in the previous chapter, he put the two components together well:

Everything depends upon the quality of experience... just as no man lives or dies to himself, so no experience lives and dies to itself. Any experience is mis-educative

that has the effect of arresting or distorting the growth of further experience. The central problem of an education based upon experience is to select the kind of... experience[s] that live fruitfully and creatively in subsequent experiences.

The question, then, is how to select such experiences, “the kind... that live fruitfully and creatively in [each kid’s] subsequent experiences.”

It’s daunting, of course, to expose kids to experiences that will be “of value” to them – in large part because those are “value decisions.” But whereas I’ve argued in early chapters that most of our values are based on our dual survival goals (of ourselves and our families – with variations because of different recognitions of what constitutes the extent of our “families”), I would now argue that two fundamental and inseparable components of the principal roles of all educators (parents, relatives, friends, teachers, other civic leaders, “role models”...) are 1) to provide kids with a variety of “fruitful and creative” experiences, and 2) to help kids extract lessons from those experiences that realistically promote, especially, each kid’s dual survival goals.

There are, however, substantial complications, such as the following.

- Whereas it’s somewhere between difficult to impossible either to predict the future or to learn what’s truly driving another person, it’s not easy to guide a kid toward even what would be most valuable for the kid’s dual survival (or “thrival”) goals. For example, should you have been given more experiences to help you become a singer or a scientist? Similarly for your nearest-age brother: would it be more “valuable” to his “family” (his society) to provide him with more experiences to help him reach his stated goal of becoming a fighter pilot or, for example, a politician.
- Whereas most of us also chose some esthetic values (symmetry, beauty, poetry, melody...), unrelated or only marginally related to our dual survival goals, kids should also be exposed to appropriate experiences that have the potential to also “live fruitfully and creatively in [each kid’s] subsequent experiences.” As a case in point, I fondly remember exposing you to Beethoven when you were little more than a baby, and my impression is that such experiences have lived “fruitfully and creatively”.

- Every experience contains a lesson, and in the long run, some bad experiences can be good for children (e.g., poverty can lead to diligence) whereas some good experience can be bad (e.g., financial prosperity can lead to decadence). Consequently, sometimes it's "valuable" to expose kids to short-term pain – to yield long-term gain.
- Yet, substantial efforts should be expended to protect kids from any exposure to some unambiguously bad experiences. For example, some drug pusher may promote kids' experiencing "the high" of cocaine (or some other illegal drug) and some clerics and other proselytizers promote kids' experiencing "the high" of the love of Jesus (or Allah or whatever), but if the lesson that a kid extracts from experiences is to seek a lifetime of such "highs", then such a lesson will almost certainly damage the kid's dual survival goals (almost certainly damaging the kid's future and probably also damaging the kid's family).
- On the other hand, it seems essentially impossible to protect some kids from some bad experiences. For example, since almost invariably most kids must learn to pursue their dual survival goals within their culture, then if the "cultural norm" is (for example in Muslim countries and many Mormon communities) that women are little more than the property of men and/or baby producers, then most girls "internalize" that lesson (in some cases, for the sake of their very survival).

Consequently, Dear, in view of such complications in attempting to identify "valuable" experiences for kids, I trust you'll forgive me for backing off from trying to identify "general principles" for educating children. After all, you asked me why I didn't believe in god; you didn't ask me for my ideas about how to educate kids!¹

In these X-chapters, in particular, I'm trying to show you how belief in god hinders prospects for worldwide peace and prosperity. Therefore, I want to emphasize how progress might be made toward peace and prosperity if more kids learned how to abandon beliefs that are unsubstantiated by evidence (e.g., their parent's "revealed" religion) and thereby, "get real". In turn and in context of helping kids extract valuable lessons from their own experiences, this means trying to get kids to develop what's now commonly

¹ Nonetheless, let me repeat the "general principle" that the fellow who became the president of the first university that I attended taught me and that I found to be valuable: "Try to keep your options open."

called “critical-thinking” skills – but which I think would be better called “evaluative-thinking”, “scientific-thinking”, “reflective-thinking”, or just “thinking” skills. Still more descriptive options are “problem-solving/decision-making skills” or “good judgment” or to force an end to the listing (☹), just (plain) “common sense”! Many good descriptions of such thinking skills are available (e.g., on the internet), and I think it might be valuable to you if I steered you toward some of them.

To start, consider the following two quotations. The first is from an article entitled “GSU Master Teacher Program: On Critical Thinking”; it was written by Harvey J. Brightman of Georgia State University.²

What is Critical Thinking?

In his [1910] book *How We Think*, John Dewey defined critical thinking as “reflective thought” – to suspend judgment, maintain a healthy skepticism, and exercise an open mind. These three activities called for the active, persistent, and careful consideration of any belief in light of the ground [or evidence] that supports it. Dewey’s definition suggests that critical thinking has both an intellectual and an emotional component. Thus we view critical thinking as the intellectual and emotional ability to go beyond the known without “falling to pieces”. Students must be taught to examine, poke, question, and reflect on what they have learned. Skepticism, questioning, and reflection are essential. Examine a problem, find a solution, think about why you were or were not successful, and learn from your successes and failures. In summary, critical thinking involves students in doing things (probing, questioning, etc.) and thinking about the things they are doing (reflecting, evaluating teacher feedback, etc.).

My second example that illustrates Dewey’s idea about “critical thinking” (or “reflective thought”) – and more – is the following quotation from an article by Giancarlo and Faione (from which I’ve omitted their references):³

Teaching for thinking has always been central to the very concept of a liberal education. The liberally educated person is one who has learned how to draw together knowledge from many different disciplines and makes good judgments about what to believe or what to do. That person who is so well educated that she or he is able to think for him or herself is the person whose mind has been liberated. They are free to think, not just in the sense of having been given permission, but also in the fuller sense of having been given the skills and the deep desire to do so...

² Available at <http://www2.gsu.edu/~dschjb/wwwcrit.html>.

³ Giancarlo, C.A. and P.A. Facione, “A Look across Four Years at the Disposition toward Critical Thinking Among Undergraduate Students”, *Journal of General Education* 50, 29, 2001; available at www.insightassessment.com/pdf_files/Giancarlo&Facione_JGE%202001.pdf.

The emphasis on thinking reflected in current approaches to education can be traced back to the philosopher John Dewey who wrote on the centrality of reflective thinking in the educational process... Almost seven decades ago Dewey presented an argument that *educators should view the nurturing of the scientific attitude of mind at the core of their endeavors when teaching children....* [Italics added] Though the terminology has changed slightly over the years, developing students' critical thinking remains a central goal of the educational process... Critical thinking [CT] has conceptual connections with reflective judgment, problem framing, higher order thinking, logical thinking, decision-making, problem solving, and the scientific method.

Actually, Dear, I'd like to quote more from the introduction of this article by Giancarlo and Facione, because in it, they provide some good background information about the definition and general characterization of what they call "critical thinking" (CT). Yet, I would have you notice that their emphasis is on college-level instruction (in problem-solving/ decision-making/ good-judgment/ evaluative-thinking/ critical-thinking skills based on the scientific method) rather than on its instruction in grade schools. Also, I should mention that I'm somewhat dissatisfied with their presentation, not only because I find the term "critical thinking" to be inadequate but also because similar to descriptions by others (as I'll be showing you later in this chapter), their description places too much emphasis on logic and reasoning and not enough on experimentation and data.

Efforts to define, teach, and measure CT [critical thinking] have intensified throughout the last quarter of a century... In 1990, under the sponsorship of the American Philosophical Association, a cross-disciplinary panel completed a two-year Delphi project which yielded a robust conceptualization of CT... Broadly conceived, CT was characterized as purposeful, self-regulatory judgment, a human cognitive process. As a result of this non-linear, recursive process a person forms a judgment about what to believe or what to do in a given context. In so doing, a person engaged in CT uses a core set of cognitive skills – analysis, interpretation, inference, explanation, evaluation, and self-regulation – to form that judgment and to monitor and improve the quality of that judgment. CT is non-linear and recursive to the extent that in thinking critically a person is able to apply CT skills to each other as well as to the problem at hand. For example, one is able to explain one's analysis, analyze one's interpretation, or evaluate one's inference...

The Disposition Toward Critical Thinking

Any conceptualization of critical thinking that focuses exclusively on cognitive skills is incomplete. A more comprehensive view of CT must include the acknowledgement of a characterological component, often referred to as a *disposition*, to describe a person's inclination to use critical thinking when faced with

problems to solve, ideas to evaluate, or decisions to make. Attitudes, values, and inclinations are dimensions of personality that influence human behavior. The disposition toward critical thinking, as a dimension of personality, refers to the likelihood that one will approach problem-framing or problem-solving by using reasoning. Thus, the disposition toward critical thinking is the consistent internal motivation to engage problems and make decisions by using thinking...

For liberal education as well as for professional preparation at the collegiate level, educators must commit to sharpening students' cognitive skills as well as strengthening their disposition toward CT. Nurturing these skills and dispositions facilitates students' recognition of opportunities to use thinking to resolve problems as well as inclines students toward doing so. A national survey of employers, policy-makers, and educators found consensus that the dispositional as well as the skills dimension of critical thinking should be considered an essential outcome of a college education...

The consensus definition of CT attained by the scholars and teachers who participated in the American Philosophical Association's Delphi project was augmented by an articulation of a description of the ideal critical thinker. Characteristics of this individual included being inquisitive, fair-minded, flexible, diligent, and focused in inquiry...

The California Critical Thinking Disposition Inventory [CCTDI] represents one of the first valid and reliable measures of a person's critical thinking disposition. The conceptualization of critical thinking from which the CCTDI was developed is one that recognizes a set of general, discipline-neutral, cognitive processes that can be used to describe thinking, problem-solving and judgment... Factor analysis [viz., as I mentioned in an earlier chapter, a particular type of statistical analysis, also called "principal component analysis"] of the CCTDI reveals seven distinct elements. In their positive manifestation, these seven bipolar characterological attributes are named truthseeking, open-mindedness, analyticity, systematicity, critical thinking (CT), self-confidence, inquisitiveness, and maturity of judgment...

As one might imagine, there are negative manifestations of each of these dispositional attributes. The antithesis of the ideal would be a person who habitually approached problem solving being intellectually dishonest, intolerant, inattentive, haphazard, mistrustful of reason, indifferent, and simplistic. While the positive characteristics are clear assets, the vices are perhaps even more obvious liabilities for scholarship, commerce, and civilized society.

From the above, you can see that the thrust to develop "critical thinking" skills in students has developed substantial momentum. In fact, promoting this thrust and this momentum has now become quite a business, as I'll illustrate immediately below.

Essentially all of what follows has been copied from original and collected articles by staff at the Center for Critical Thinking, whose very good website is at <http://www.criticalthinking.org/>; when there, click on “Resources”. If you wonder why I have copied so much from this site (when you can easily just read the articles at their website), I would respond with three points:

- 1) There are almost 100 articles available at their website, and because you may be more “rushed for time” than I, I’ll be showing you parts of just a few of those articles that I consider most relevant,
- 2) In some of the articles that I’ll quote, I think that the authors didn’t adequately address the serious limitations on all logic and failed to appreciate the full advantages of the scientific method, and in some cases, either didn’t adequately apply “political correctness” (or at least, “sound business-practices”) or refused to comply with it, and thus
- 3) In general, I think that in a number of cases, the authors didn’t adequately display what they call “critical thinking”!

And because I’ll be rather critical of some of the “critical thinking” of some members of “The Foundation and Center for Critical Thinking” (!), let me point out why. On the one hand, all cases of “malpractice” should be addressed and appropriately corrected. And on the other hand, these self-appointed “critical thinkers” are apparently in the business of selling “critical thinking” for profit (to schools, universities, and businesses) – and in earlier chapters, I’ve already expressed my desire for more “consumer protection”!

To see more about “The Foundation and Center for Critical Thinking”, notice the following “advertisements” (from the indicated webpages).

Welcome to the Critical Thinking Community (<http://www.criticalthinking.org/>)

The Foundation and Center for Critical Thinking aim to improve instruction in primary and secondary schools, colleges and universities. We offer conferences and professional development programs, emphasizing assessment, research, instructional strategies, Socratic questioning, critical reading and writing, higher order thinking, quality enhancement, and competency standards.

About Us (<http://www.criticalthinking.org/about/>)

The work of the Foundation is to integrate the Center’s research and theoretical developments, and to create events and resources designed to help educators improve

their instruction. The Foundation's materials include books, micro-publications, and videos. The Foundation sponsors an annual national tour of weekend seminars, the National Academy: Training for Trainers, and the National Academy for Administrators.

Professional Development in Critical Thinking...

- K-12
- Higher Education
- Business

Research suggests that critical thinking is not typically an intrinsic part of instruction at any level. Students reach high school, college, and beyond without training in it. At the same time, faculty tend to take it for granted as an automatic by-product of their teaching. Yet without critical thinking systematically designed into instruction, learning is typically transitory and superficial. What can we do?

There are no easy answers to this problem, for students and instruction will not be transformed over night. However, with well-designed long-term professional development in critical thinking, faculty can begin to teach for critical thinking.

Having conducted successful workshops at more than 600 institutions, for more than 70,000 educators, Dr. Richard Paul and his team of distinguished presenters know how to lay the necessary foundations and then build for the future through follow-up workshops. Highly practical, each workshop is designed to ensure that participants think their way through critical thinking concepts and principles and then apply these concepts and principles to the redesign of instruction.”

Thereby, Dear, notice that these people claimed to have trained more than “70,000 educators” (!); consequently, I think it's quite appropriate both to see what they're promoting and (where appropriate) suggest areas where their training seems inadequate.

To start showing you some of their ideas, let me quote in full and comment upon their article entitled *Defining Critical Thinking*, reported to be “a statement by Michael Scriven & Richard Paul for the National Council for Excellence in Critical Thinking Instruction”.⁴ To minimize interruptions of their text, I've delayed my comments until the end of appropriate paragraphs, and where appropriate, I've added boldface superscript letters in the text (such as with^A) to indicate where the comment applies.

⁴ The article is at <http://www.criticalthinking.org/aboutCT/definingCT.shtml>.

Defining Critical Thinking

Critical thinking can be seen as having two components: 1) a set of information and belief generating^A and processing skills, and 2) the habit, based on intellectual commitment, of using those skills to guide behavior. It is thus to be contrasted with: 1) the mere acquisition and retention of information alone, because it involves a particular way in which information is sought and treated; 2) the mere possession of a set of skills, because it involves the continual use of them; and 3) the mere use of those skills (“as an exercise”) without acceptance of their results.

A. In general I can agree with this statement, but would criticize the use of the term “belief generating” (which was also used by Giancarlo and Facione, quoted earlier). As a minor point, whereas the authors apparently market “critical thinking skills” to school boards throughout the country, it would seem unprofitable to describe critical thinking as a “belief generating... skill” – I can imagine many members of many school boards saying: “Thanks anyway, but in our churches and community, we have our own ways of generating beliefs”!

In addition, I question the appropriateness and the wisdom of their use of the now-common term “critical thinking” – when what they mean is “problem-solving, decision-making, evaluative thinking skills based on the scientific method.” Granted, “that’s a mouthful”, but if they want a more concise term, they could use “evaluative thinking” or “scientific thinking” or “good judgment” or just “common sense”! More specifically, I question the appropriateness of the term “critical thinking” because 1) more than thinking is needed to solve problems (sometimes the only way to solve a problem is to start working on it, e.g., the problem that your room is such a mess!), and 2) “critical” can be used to mean both “essential” (which almost certainly is what’s meant) and “criticizing” (which can be appropriate in “good judgment or intelligence” if it means “self criticism” but which can be misunderstood to mean criticizing others). Furthermore, I question the wisdom of the use of the term “critical thinking” if (as is apparently the case) the authors propose to sell their knowledge of the subject to school boards throughout the country (and throughout the world).

More significantly (and as you know from what I’ve written in this book), I seriously object to linking the word ‘belief’ to any skill in “critical thinking”/ “evaluative thinking”/ “good judgment”/ “common sense”. According to my dictionary, the meanings for the word ‘belief’ include: “acceptance by the mind that something is true or real, often underpinned by an emotional or spiritual sense of certainty”, “a statement, principle, or

* Go to other chapters *via*

doctrine that a person or group accepts as true”, “an opinion, especially a firm and considered one”, and “religious faith”. As I’ve tried to show you, none of those meanings have any relation whatsoever with good judgment or common sense!

And of course I can agree that the authors probably used ‘belief’ in the sense of “tentative acceptance as correct”, but this statement is advertised to “Defining Critical Thinking” (and given by claimed “experts” in critical thinking) – whereas what’s presented is an example of sloppy thinking. What the authors probably meant to write (or should have meant!) is probably closer to: “Critical thinking (or “evaluative thinking” or “good judgment” or “common sense”) can be seen as having two components: 1) a set of skills for gathering information, reaching tentative conclusions, and testing the appropriateness of those conclusions against data, and 2) the routine, based on intellectual commitment, of using those skills to guide one’s behavior.”

Critical thinking varies according to the motivation underlying it.^B When grounded in selfish motives, it is often manifested in the skillful manipulation of ideas in service of one’s own, or one’s groups’, vested interest. As such it is typically intellectually flawed, however pragmatically successful it might be. When grounded in fair-mindedness and intellectual integrity, it is typically of a higher order intellectually, though subject to the charge of ‘idealism’ by those habituated to its selfish use.

B. This paragraph is loaded with examples of uncritical thinking! Evaluative thinking/ scientific thinking/ good judgment/ common sense doesn’t “vary according to the motivations underlying it”: the only motivations driving good judgment are to understand and to try to solve some problem! What the authors are probably trying to say is that the resulting understanding can be used in many ways (consistent with the phrase “knowledge is power”).

Further, there’s no need to introduce the value-laden words “selfish”, “service”, “fair-mindedness” and the nebulous and arrogant terms “intellectually flawed”, “intellectual integrity, and “higher order intellectually” – and if the authors hope to sell their product to school boards, I can think of several reasons why its unwise to use such concepts! For example, I can imagine a school-board member saying: “Do you mean that you want us to pay you to instruct our teachers to be able to show our

students how to use a loaded weapon – and we’re to just hope that the students use it ‘properly’?”

In addition, with their use of “value-laden words”, the authors are skating on philosophically thin ice. Thus, Dear, in spite of what you’ve been taught since you were a baby, strong philosophical and psychological arguments can be made for the case that all actions of all people are always “selfish” – variations appear only because different people have different perceptions of what’s in their self interest and different abilities to foresee the future. For example, the “selflessness” of all “good Christians” (and Mormons and Muslims) is directed toward the extremely selfish (and silly) goal of getting into heaven. Even humanists help others for selfish goals – because they’ve found data to support the principle that “What goes around, comes around” (viz., “reciprocal altruism”), i.e., they seek to live in communities in which people help one another.

And I suspect (or hope) that, when the authors see the errors in their statements that I’ve already criticized, then I wouldn’t need to explain to them why they shouldn’t use their nebulous and arrogant terms “intellectually flawed”, “intellectual integrity, and “higher order intellectually”!

Critical thinking of any kind is never universal in any individual; everyone is subject to episodes of undisciplined or irrational thought.^C Its quality is therefore typically a matter of degree and dependent on, among other things, the quality and depth of experience in a given domain of thinking or with respect to a particular class of questions. No one is a critical thinker through-and-through, but only to such-and-such a degree, with such-and-such insights and blind spots, subject to such-and-such tendencies towards self-delusion. For this reason, the development of critical thinking skills and dispositions is a life-long endeavor.

C. That’s poor! As a counterweight to “critical thinking” the sentence posits “undisciplined or irrational thought”, which suggests that “critical thinking” is “disciplined or rational thought”. Now, Dear, although “critical thinking” (and more generally, scientific thinking or good judgment or common sense) certainly include “rational thought”, yet as I’ve tried to illustrate (e.g., in **R**) with the horrible mistakes made by so many people (including Plato, Aristotle, “Saint” Augustine, “Saint” Thomas, Descartes, Kant, and so on – including your father and me!), “rational thought” is a necessary but definitely an insufficient condition for good judgment: common sense dictates that thoughts must be tested against data!

* Go to other chapters *via*

And of course it's true that the authors can recover from their error by suitably enlarging their meaning of "disciplined thought", but as you'll see when you read further, the authors don't mean what they should (i.e., disciplining one's thought with data) but mean self discipline (i.e., mental self discipline) – which is inadequate. Nonetheless, I can agree with the authors' statement that "the development of critical thinking skills and dispositions (or better, good judgment or common sense) is a life-long endeavor" – and hope that they take that prescription to heart!

Why Critical Thinking?

The Problem:^D

Everyone thinks; it is our nature to do so. But much of our thinking, left to itself, is biased, distorted, partial, uninformed or down-right prejudiced. Yet the quality of our life and that of what we produce, make, or build depends precisely on the quality of our thought. Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated.

D. Good heavens! What a biased, imprecise, parochial view – I assume because what the authors are trying to do is sell their wares to local school boards. Dear: "The problem" (caused by under-utilized or even undeveloped judgment) is most of the problems of the world! – from all the problems associated with people wasting their lives trying to get to a never-never land called 'heaven' (including hijacking and then flying airplanes into buildings) to the hugely diminished prospects for peace and prosperity throughout the world! Thereby, I hope the authors will reconsider the concept "the quality of... what we produce... depends precisely on the quality of our thought" – and also consider the possibility that the quality of what we produce depends on available resources (including time) and on who we're trying to sell the product to (e.g., local school boards and affiliated industries).

A Definition:

Critical thinking is that mode of thinking – about any subject, content, or problem – in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.^E

E. That statement is poor insofar as it doesn't define "imposing intellectual standards". But as you can find from reading further, what the authors apparently mean is the obvious, namely, that the "intellectual standards" are self-imposed, mentally. That, however, is totally inadequate, for reasons

that I've tried to illustrate (in **R**, with examples from Aristotle to your father). Thus, instead of self-imposed intellectual standards, the critical feature of critical thinking (or better, good judgment or common sense) is imposing standards dictated by data!

The Result

A well-cultivated critical thinker:

- raises vital questions and problems, formulating them clearly and precisely;
- gathers and assesses relevant information, using abstract ideas to interpret it effectively
- comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;^F
- thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
- communicates effectively with others in figuring out solutions to complex problems.

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem solving abilities and a commitment to overcome our native egocentrism and sociocentrism.

F. Again the authors miss the critical point in “critical thinking” (or good judgment or common sense), namely, data or evidence! They miss it again in “Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking.” That’s far too self-centered! To be a successful “critical thinker”, to develop good judgment or common sense, what’s needed is not to apply self-discipline but discipline from data; what’s important is not what a person thinks but what reality demands!

Summary

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.

It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue; assumptions; concepts; empirical grounding; reasoning leading to conclusions; implications and consequences; objections from alternative viewpoints; and frame of reference. Critical thinking – in

being responsive to variable subject matter, issues, and purposes – is incorporated in a family of interwoven modes of thinking, among them: scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking.

My assessment of this summary is that “it’s not too bad”, but excerpts from what I consider to be a better “definition article” (which is also co-authored by Paul) are included below, along with a few of my comments [in brackets and separated from Paul’s text.] In this article,⁵ some of the undefined terms in the above summary (e.g., “clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness”) are explained.

The Critical Mind is A Questioning Mind Learning How to Ask Powerful, Probing Questions

R. Paul and L. Elder
May 1996

Introduction

The key to powerful thinking is powerful questioning. When we ask the right questions, we succeed as a thinker, for questions are the force that powers our thinking. Thinking, at any point in time, can go off in thousands of different directions, some of which, by the way, are dead-ends. Questions define the agenda of our thinking. They determine what information we seek. They lead us in one direction rather than another. They are, therefore, a crucial part of our thinking.

[By the way, Dear, that’s why “critical thinking” is sometimes described as “the Socratic method”, because as I’ve illustrated in an earlier chapter and will show you more in later chapters, Plato left us records of how Socrates tried to understand by seeking answers to probing questions.]

“By their questions yea shall know them”

If there were a bible for critical thinking, “By their questions yea shall know them” would be a salient teaching within it. We shall use the art of asking powerful questions as a key organizer for this book.⁶ We shall use it as the vehicle for teaching the fundamental tools of critical thinking. We shall translate all concepts,

⁵ The article is at <http://www.criticalthinking.org/resources/articles/critical-mind.shtml>.

⁶ By “this book” perhaps they’re referring to their book *Critical Thinking Handbook: Basic Theory and Instructional Structures* by Richard W. Paul, and Linda Elder (Publisher: Foundation for Critical Thinking; Copyright: 1999, revised 2000 edition) – although this article’s date precedes that book’s publication date.

understandings, and principles into the questions one asks when one internalizes them.

The Basic Building Blocks for Thinking: One Key To Powerful Questioning

For example, one basic understanding essential to critical thinking is based on insight into the basic structures common to all thinking. Another is based on insight into fundamental standards for the assessment of thinking. From the foundation of both of these understandings we can generate powerful questions for the thinker to ask, questions that can be usefully asked about virtually any thinking in virtually any context; questions that give us leverage by helping us not only to get to the foundation of thinking, but also to begin to determine its strengths and weaknesses.

Let us begin with the elements of thought. These are the inescapable structures underlying one's thinking every step along the path of thought. If one is thinking about anything, one is using these structures. They are generated by every act of thinking by its very nature.

The Elements of Thought

The elements of thinking are as important to thinking as the elements of chemistry are to the composition of every substance. Unless we know the basic chemical building blocks of chemical composition, we cannot identify, examine, and check those building blocks (and hence do chemistry). Unless we know the basic building blocks of thinking, we cannot identify, examine, and check those building blocks (and hence do critical thinking).

Questions for Thinking about Thinking: Breaking Thinking Down

As a developing critical thinker, you must regularly take your thinking apart and come to terms with its interrelated elements (the constituent parts that make it up). Coming to understand the elements of thought is not a matter of memorizing definitions of a set of terms. Rather, it is a matter of understanding an interrelated set of functions that all thinking unavoidably includes. Just as you can say with confidence that wherever there is a living human being, the body of that person will necessarily include certain constituent, interrelated physiological systems (the nervous system, the cardiovascular system, the respiratory system, etc.), so too as a thinker you can say with confidence that if you are dealing with the thinking of any human, there are constituent, interrelated elements that make it up.

[Dear: I wonder if you, too, are thinking: "Enough with the analogies, already; get to the point!" Also, I wonder if you, too, are thinking: "Careful, here, these authors are reductionists (wanting to take things apart, to look at the pieces). Meanwhile, though, reductionists can so very easily miss that in many systems a 'critical' function isn't seen *via* reduction into components because this function is derived only from understanding how components interact." For examples, again see Wolfram's book *A New Kind of Science*, referenced in an earlier chapter. In the case of thinking,

* Go to other chapters *via*

reductionism is great for left-brain analysis, but it would be foolish not to utilize, also, right brain's amazing capabilities to synthesize (as I tried to show you much earlier in the book, starting in Chapter **B**.)

The Elements Enumerated

Let us now consider these elements. To think as a human is to think for a purpose (our thinking never lacks some end, some motivation, some goal). In pursuing a purpose (using thought), questions are generated (for example, how can I best achieve this purpose?). To answer a question you need information that bears on it. To use information, you must make sense of it. To make sense of information, you must come to some conclusions, make some inferences. To make inferences, you must use concepts. To use concepts, you must make assumptions. To make assumptions leading to inferences generates implications and consequences. And, finally, to think purposively, using information, to come to conclusions is to think within a point of view.

[And then, Dear, the authors missed the most critical part of “critical thinking”/ scientific thinking/ evaluative thinking/ good judgment/ common sense, namely, after reaching conclusions, check them against the real world, i.e., “Show me the data!” And incidentally, Dear, and unfortunately, this is the step that Socrates never took, that Plato didn't understand, that Aristotle did only a little of, and that led to a thousand years of Dark Ages under Christianity – and continues today in most Muslim countries. Meanwhile, some people {especially many Muslim scientists, starting with Ibn al-Haytham (or Alhazen, 965–1039), and then European scientists such as Roger Bacon (1214–94) and Frances Bacon (1561–1626)} showed the critical need for data – in part thereby showing the “Christian world” the advance in good judgment or intelligence made by the Muslims, an advance that their damnable clerics have subsequently suppressed.]

This will be perhaps clearer with an example.

- Imagine, for a moment, that my purpose is to get a better job, then [*sic*; i.e., either the comma should be replaced with a semicolon or a new sentence should start with “Then”] there are necessarily some questions inherent in that purpose: What jobs are available that I might qualify for and would be interested in? What are the advantages and disadvantages of each available job? How can I most effectively apply for the jobs that best suit me?
- Once these questions are clear to us [*sic*; it should be “me” or drop the “to us”], it is a short step in thought to recognizing that I will have to gather information about available jobs, etc...
- Once I get my information, I will then have to come to some conclusions about potential jobs: which seem the best options and how I should go about pursuing those options. [*sic*; question mark is needed]

- Unavoidably in deciding to pursue some options I will be making some assumptions about my qualifications, the nature of the jobs themselves, and about the future (the likelihood of my being satisfied by working in this or that setting, for example).
- My thinking will also be generating some implications, which I ought to look at: the implications of possibly being out of a job for a period of time, the implications of possibly losing seniority, or of having greater difficulty getting to and from work, the impact on my family, etc.
- In my thinking I should also look at the very concept or idea of improving the quality of my life by improving the quality of my job. I should make sure that I am not uncritically assuming that a job change will make my life better in general or that problems that stem from other parts of my life will be lessened by a change of job. (Remember, we cannot think without ideas and concepts)
- I should also think about my overall point of view in pursuing the option of a change of job. How am I looking at my present circumstances? How am I envisioning a change? How realistic is my viewpoint? How does it relate to my overall life objectives (my way of looking at the nature and direction of my life in general)? What other points of view do I need to consider? If a job change might require a move, what is my spouse's point of view?

This is, of course, only a very sketchy example. If I were actually thinking through a potential job change, there would be many details and specifics incorporated in my thinking. Nevertheless [they mean "Nonetheless"], when you become comfortable with and practiced in explicitly analyzing and evaluating these basic structures of thought, they will serve as a powerful set of guides for the generation of useful questions. You will find yourself frequently questioning in each of these categories:

What is my purpose, goal, or agenda? (at this meeting, in engaging in this discussion, in carrying on this argument, in my job, in my marriage, as a parent, in buying a new car, in my relationship with Jack, in my leisure time, in my life as a whole)

What is the key question I must answer? What is the main problem I need to solve? What is the crucial issue I must resolve?...

What is the key information I need to answer the question? What is the information I need to solve the main problem? What is the information I need to resolve the crucial issue?...

Given the information I have at my disposal, what tentative conclusions can I come to? How can I best interpret the information I have?...

What is the key concept or idea I need to understand to make sense of the data and to answer the question, solve the problem, or resolve the issue?...

As I think through this question, problem, or issue, what am I taking for granted or assuming? Am I justified in doing so?...

Given what I have reasoned through thus far, what does my reasoning imply? If I act on my conclusions, what are the implications or consequences likely to be?...

From what point of view am I approaching this question, problem, or issue? Should I consider an alternative point of view?...

As you deploy these questioning strategies in the various domains of your life, you will discover features of your thinking that need to be revised, rethought, and reconstructed. You will discover that many of the purposes and goals that are buried in your behavior need to be questioned. You will discover that you are often unclear about questions and problems that you need to be clear about. You will find that as you put questions and problems in a clear and precise form, you are better able to answer and solve them. You will find that when the key question is clearly before your mind, the information relevant to the question is much more apparent.

You will then more explicitly seek out the information you need. As you explicitly seek out information, you will find yourself checking that information more closely and judging it more effectively. When you are more clear about the information you are using, you will also become more clear about the inferences or conclusions you are coming to based on that information. Once these relationships become clear, other relationships also become clearer to you. For example, when you recognize you are coming to a particular conclusion based on particular information, you will also notice that you are making one or more assumptions and using one or more concept or idea. Understanding that you are engaged in the sum total of the above, you will recognize that you are thinking within a point of view.

In other words, the process of simply questioning the basic elements of your own thinking will automatically improve the quality of your thinking. Furthermore, the more you do so, the better you get at it.

For example, when I question the information I am using in coming to conclusions about people and events in my life, I often discover that I don't have enough relevant information to come to sound conclusions. I nevertheless find myself coming to conclusions. When I catch myself engaging in such flawed thought, I then question those conclusions. I take them out of the category of "fact" and put them into the category of a hypothesis or guess.

Recognizing that I don't have solid information to go on, I then question my motivation. I ask myself whether I have an egocentric motive for my conclusion. For example, suppose someone rubs me the wrong way on one occasion. I may find myself coming to a negative conclusion about the person on another occasion without good reason for doing so. I then recognize that I am allowing my native egocentric

tendency toward prejudicial thinking to take control. I can then correct for my unjustifiable inference.

Questions for Thinking about Thinking: Using Explicit Intellectual Standards to Assess Thinking

As a developing critical thinker, you must not only regularly take your thinking apart and come to terms with its interrelated elements (the constituent parts that make it up), you must also come to question those elements using explicit intellectual standards. Coming to understand the basic standards for thought is not a matter of memorizing definitions of a set of terms. Rather, it is a matter of understanding an interrelated set of standards that virtually all thinking must fulfill to be sound thinking.

It is ironic that humans have been assessing thinking for thousands of years but have spent very little time coming to terms with the criteria they habitually use in deciding which thinking to accept and which to reject, which to praise and which to criticize. Of course, once we recognize that the human mind by nature is deeply prone to self-deception and to using thinking in a highly self-serving way – then, we should not be surprised that the implicit standards that humans instinctively use to assess thinking are not only intellectually flawed but actually intellectually absurd. We have in mind the following criteria...:

“It’s true because I believe it”

(innate egocentrism: in which case I find myself continually assuming that what I believe is true even though I have never questioned the basis for many of my beliefs)

“It’s true because we believe it”

(innate sociocentrism: in which case I find myself continually assuming that the dominant beliefs in the groups to which I belong are true even though I have never questioned the basis for many of these beliefs)

“It’s true because I want to believe it”

(innate wish-fulfillment: in which case I find myself believing in, for example, accounts of behavior that put me (or the groups to which I belong) in a positive rather than a negative light, even though I have not seriously considered the evidence for the more negative account. I believe what “feels good,” what supports my other beliefs, what does not require me to change my thinking in any significant way, what does not require me to admit I have been wrong)

“It’s true because I have always believed it”

(innate self-validation: in which case I feel a strong ego-attraction to beliefs that I have long held, even though I have not seriously considered the evidence for the critique of these traditional beliefs).

“It’s true because it is in my vested interest to believe it”

(innate selfishness: in which case I find myself gravitating to beliefs which if true would justify my getting more power, money, or personal advantage and not noticing the evidence or reasoning against those beliefs)

If we concede that humans are naturally prone to assess thinking in keeping with the above “criteria,” then it is not surprising that we, as a species, have not developed a significant interest in establishing and teaching legitimate intellectual standards. There are too many domains of our thinking that we, collectively, do not want questioned. We have too many prejudices that we do not want challenged. We are committed to having our vested interests served. We are not in fact typically concerned to protect the rights of others. We are not typically willing to sacrifice our desires to meet someone else’s basic needs. We do not want to discover that beliefs which we have taken to be “obvious” and “sacred” might not be either. We will ignore any number of basic principles if doing so enables us to maintain our power or to gain more power and advantage.

In other words, the irony of the failure of humans to make a commitment to substantive intellectual standards is not puzzling, however vexing it may be. Nevertheless, to develop as a thinker, to become a thinker with a foundational knowledge of how to analyze, assess, and improve thinking, we must internalize the logic of basic intellectual standards. These are eight basic intellectual standards we shall concentrate on. Each speaks for itself and is consequently highly intuitive, from an intellectual point of view. For example, suppose someone said,

“OK, OK, admittedly my thinking is typically unclear, inaccurate, imprecise, irrelevant, superficial, narrow-minded, illogical, and trivial!!! What’s wrong with that!!!;” we would immediately recognize the statement to be absurd. There is no need to “prove” that, all other things being equal, clear thinking is better than unclear thinking, accurate thinking better than inaccurate, precise thinking better than imprecise, relevant better than irrelevant, etc. This is intuitive to us – if the question is explicitly put to us, because on many occasions we have experienced the problems that result from a failure to check thinking against such standards.

For example, we have tried to find a place with unclear directions; we have been misled by inaccurate statements; we have not had the (precise) details we needed in some context; we were diverted from achieving what we were after by getting drawn off into irrelevant details; we failed to deal with the complexity of an issue (responding rather to it superficially); we reasoned narrowly ignoring an alternative point of view only to find that we needed the insight that only that point of view could provide; etc.

In other words, though we all frequently fall prey to using “absurd” standards (because they often function subconsciously and self-servingly), we nevertheless are quite capable of recognizing appropriate intellectual standards when they are put to us explicitly and consciously. At an abstract level virtually everyone – if the question were properly put to them – would value being able to think clearly, precisely,

accurately, relevantly, deeply, broadly, and logically. The problem is that the question is not being put to us. The basic intellectual standards essential to critical thinking are not typically taught in schools or in the home. They are certainly not being taught in the popular media. Indeed, if anything, the school, the home, the media, and social life in general tend to praise thinking that is self-serving, egocentric, and sociocentric. Inadvertently, we teach, therefore, “absurd” standards for thinking, though of course these absurd standards serve various (pathological) human functions – like justifying getting what we want (irrespective of the legitimate rights of others) or protecting the status quo when it favors us (irrespective of who suffers deprivation as a result), etc.

Questions based on the standards for thought are, as we have already suggested, largely intuitive when explicitly expressed:

Is my thinking clear?

Is my thinking accurate?

Is my thinking as precise as it needs to be?

Is my thinking relevant to the issue?

Is my thinking dealing with the complexities of this issue or problem?

Is my thinking too narrow or one-sided?

Is my thinking logical?

Is my thinking focusing on what is most significant?

[And, Dear, add the critical question: Is my thinking consistent with the data?!]

Each of these basic questions leads to more refined questions that enable us to make a better determination of where our thinking stands. Consider each of these sub-questions as follow-up on the basic ones:

Is my thinking clear?

Clarity is a gateway standard. If a statement is unclear, we cannot determine whether it is accurate or relevant. In fact, we cannot tell anything about it because we don't yet know what it is saying. For example, the question “What can be done about the education system in America?” is unclear. In order to adequately address the question, we would need to have a clearer understanding of what the person asking the question is considering the “problem” to be. A clearer question might be “What can educators do to ensure that students learn the skills and abilities which help them function successfully on the job and in their daily decision-making?”

Do I need to elaborate my thinking more?

Do I need to provide an illustration of what I mean?

Do I need to give an example from everyday life?

Is my thinking accurate?

How could I check to see if this is true?

How could I find out if this is correct?
How could I verify or test to see if this is accurate?

Is my thinking as precise as it needs to be?

Do I need to be more specific?
Do I need to give more details?
Do I need to be more exact?

Is my thinking relevant to the issue?

How does that relate to the question at issue?
How does that bear upon the problem I am concerned with?
How does this information help me effectively deal with the issue?

Is my thinking dealing with the complexities of this issue or problem?

A statement can be clear, accurate, precise, and relevant, but superficial (that is, lack depth). For example, the statement “Just Say No” which is often used to discourage children and teens from using drugs, is clear, accurate, precise, and relevant. [Nonetheless], it lacks depth because it treats an extremely complex issue, the pervasive problem of drug use among young people, superficially. It fails to deal with the complexities of the issue.

What factors make this a difficult problem?
What are some of the complexities embedded in this issue?
What are some of the difficulties I need to deal with?

Is my thinking taking into account the multiple perspectives I need to consider?

A line of reasoning may be clear, accurate, precise, relevant, and deep, but lack breadth (as in an argument from either the conservative or liberal standpoints which gets deeply into an issue, but only recognizes the insights of one side of the question.)

Am I looking at this issue in a narrow-minded way?
Do I need to look at this from another perspective?
Do I need to consider another point of view?
Do I need to look at this situation in other ways?

Is my thinking logical?

When we think, we bring a variety of thoughts together into some order. When the combination of thoughts is mutually supporting and makes sense in combination, the thinking is “logical.” When the combination is not mutually supporting, is contradictory in some sense, or does not “make sense,” the combination is “not logical.”

Does my thinking make sense together?
Does my conclusion follow from the evidence or is there a more logical conclusion?

[Dear: that certainly is a “minimalist’s idea” of logic! With that (even minimal Aristotelian logic) you’d never see that $1 + 1$ (e.g., adjacent holes in your jeans) can equal 1! Further, if thoughts were restricted to what “makes sense” (rather than to what’s consistent with data), all of the theories of relativity and quantum mechanics would need to be thrown in the trash – as well as a huge amount of “probabilistic arguments”, e.g., computer analyses based on “fuzzy logic”, e.g., of nuclear accidents.]

Is my thinking focusing on what is most significant?

Is this the most important problem I need to deal with at this time?

Which of these facts are the most important for me to consider?

Is this the most essential idea which I should focus on?

Some Universal Intellectual Standards – and questions that can be used to apply them

Universal intellectual standards are standards which must be applied to thinking whenever one is interested in checking the quality of reasoning about a problem, issue, or situation. To think critically entails having command of these standards. To help students learn them, teachers should pose questions which probe student thinking, questions which hold students accountable for their thinking, questions which, through consistent use by the teacher in the classroom, become internalized by students as questions they need to ask themselves.

The ultimate goal, then, is for these questions to become infused in the thinking of students, forming part of their inner voice, which then guides them to better and better reasoning. While there are a number of universal standards, the following are the most significant:

Clarity:

Could you elaborate further on that point? Could you express that point in another way? Could you give me an illustration? Could you give me an example?...

Accuracy:

Is that really true? How could we check that? How could we find out if that is true? A statement can be clear but not accurate, as in “Most dogs are over 300 pounds in weight.”

Precision:

Could you give me more details? Could you be more specific? A statement can be both clear and accurate, but not precise, as in “Jack is overweight” (We don’t know how overweight Jack is, one pound or 500 pounds.).

Relevance:

How is that connected to the question? How does that bear on the issue? A statement can be clear, accurate, and precise, but not relevant to the question at issue. For example, students often think that the amount of effort they put into a course should be used in raising their grade in a course. Often, however, “effort” does not measure the quality of student learning, and when that is so, effort is irrelevant to their appropriate grade.

Depth:

How does your answer address the complexities in the question? How are you taking into account the problems in the question? Is that dealing with the most significant factors?

Breadth:

Do we need to consider another point of view? Is there another way to look at this question? What would this look like from a conservative standpoint? What would this look like from the point of view of...?

Logic:

Does this really make sense? Does that follow from what you said? How does that follow? But before you implied this and now you are saying that; I don't see how both can be true.

Still better definitions of (and arguments for) critical thinking (or better, scientific thinking, good judgment or common sense) were conceived by Bertrand Russell. His ideas are competently summarized by William Hare in the article below (in which, in a few places, I've added bold-face type, to try to ensure you to notice the ideas).⁷ The numbers in the text identify the author's references, which I've included – in part to try to impress you with Russell's productivity! And at the outset, let me add my assessment that Hare's is a tremendous article: not only for what it describes about critical thinking (or better, scientific thinking or good judgment or common sense), but also because the author both seems to appreciate Russell's brilliance as much as I – and he knows much more about it! Besides, Dear, if you read the article carefully, you'll be able to discern some current “critical thinking” about “critical thinking”.

⁷ From <http://www.criticalthinking.org/resources/articles/bertrand-russell.shtml>. This article, by William Hare, appeared in the *Journal of Thought* 36, 1, 2001 (pp. 7–16), and was first published in the *Proceedings of the Twentieth World Congress of Philosophy* (The Paideia Project On-line), 1999.

Bertrand Russell on Critical Thinking

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ABSTRACT: The ideal of critical thinking is a central one in Russell's philosophy, though this is not yet generally recognized in the literature on critical thinking. For Russell, the ideal is embedded in the fabric of philosophy, science, liberalism and rationality, and this paper reconstructs Russell's account, which is scattered throughout numerous papers and books. It appears that he has developed a rich conception, involving a complex set of skills, dispositions and attitudes, which together delineate a virtue which has both intellectual and moral aspects. It is a view which is rooted in Russell's epistemological conviction that knowledge is difficult but not impossible to attain, and in his ethical conviction that freedom and independence in inquiry are vital. Russell's account anticipates many of the insights to be found in the recent critical thinking literature, and his views on critical thinking are of enormous importance in understanding the nature of educational aims. Moreover, it is argued that Russell manages to avoid many of the objections which have been raised against recent accounts. With respect to impartiality, thinking for oneself, the importance of feelings and relational skills, the connection with action, and the problem of generalizability, Russell shows a deep understanding of problems and issues which have been at the forefront of recent debate.

The ideal of critical thinking is a central one in Russell's philosophy, though this is not yet generally recognized. Russell's name seldom appears in the immense literature on critical thinking **which has emerged in philosophy of education over the past twenty years**. Few commentators have noticed the importance of Russell's work in connection with any theory of education which includes a critical component. Chomsky, for example, reminds us of Russell's humanistic conception of education, **which views the student as an independent person whose development is threatened by indoctrination**. Woodhouse, also appealing to the concept of growth, points out Russell's concern to protect **the child's freedom to exercise individual judgment on intellectual and moral questions**. Stander discusses Russell's claim that **schooling all too often encourages the herd mentality**, with its fanaticism and bigotry, failing to develop what Russell calls a "critical habit of mind". (Endnote #1) The threat of indoctrination, the importance of individual judgment, and the prevalence of fanatical opinions all point up the need for what nowadays is called critical thinking; and Russell's work is valuable to anyone who wants to understand what this kind of thinking entails and why it matters in education.

More needs to be said, however, to establish the significance of Russell's conception of critical thinking, which anticipates many of the insights in contemporary discussions and avoids many of the pitfalls which recent writers identify. Some factors, perhaps, obscure a ready appreciation of Russell's contribution. His comments on critical thinking are scattered throughout numerous writings, never

systematized into a comprehensive account;(2) **nor did Russell tend to use the now dominant terminology of “critical thinking”**. This phrase only began to come into fashion in the 1940s and 1950s, and earlier philosophers spoke more naturally of **reflective thinking, straight thinking, clear thinking, or scientific thinking**, often of thinking simpliciter. There are useful distinctions to be drawn among these, but it is often clear from the context that, despite terminological differences, the issue concerns what is now called critical thinking. Russell uses a wide variety of terms including, occasionally, references to a critical habit of mind, the critical attitude, critical judgment, solvent criticism, critical scrutiny, critical examination, and critical undogmatic receptiveness. **The ideal of critical thinking is, for Russell, embedded in the fabric of philosophy, science, rationality, liberalism and education**, and his views emerge as he discusses these and other themes.(3)

Russell’s conception of critical thinking involves reference to a wide range of skills, dispositions and attitudes, **which together characterize a virtue that has both intellectual and moral aspects, and which serves to prevent the emergence of numerous vices, including dogmatism and prejudice**. Believing that **one central purpose of education is to prepare students to be able to form “a reasonable judgment on controversial questions in regard to which they are likely to have to act”**, Russell maintains that in addition to having “access to impartial supplies of knowledge,” **education needs to offer “training in judicial habits of thought.”**(4) Beyond access to such knowledge, students need to develop certain skills if the knowledge acquired is not to produce individuals who passively accept the teacher’s wisdom or the creed which is dominant in their own society. Sometimes, **Russell simply uses the notion of intelligence**, by contrast with information alone, to indicate the whole set of critical abilities he has in mind.

Such critical skills, grounded in knowledge, include:

- (i) the ability to form an opinion for oneself,(5) which involves, for example, being able to recognize what is intended to mislead, being capable of listening to eloquence without being carried away, and becoming adept at asking and determining if there is any reason to think that our beliefs are true;
- (ii) the ability to find an impartial solution,(6) which involves learning to recognize and control our own biases, coming to view our own beliefs with the same detachment with which we view the beliefs of others, judging issues on their merits, trying to ascertain the relevant facts, and the power of weighing arguments;
- (iii) the ability to identify and question assumptions,(7) which involves learning not to be credulous, applying what Russell calls constructive doubt in order to test unexamined beliefs, and resisting the notion that some authority, a great philosopher perhaps, has captured the whole truth. Russell reminds us that “our most unquestioned convictions may be as mistaken as those of Galileo’s opponents.”(8)

In short, his account of critical skills covers a great deal of the ground set out in detailed, systematic fashion in more recent discussions.(9)

There are numerous insights in Russell's account which should have a familiar ring to those acquainted with the recent critical thinking literature. First, Russell's language, especially his emphasis on judgment, suggests the point that critical skills cannot be reduced to a mere formula to be routinely applied. **Critical judgment means that one has to weigh evidence and arguments, approximate truth must be estimated, with the result that skill demands wisdom.** Second, critical thinking requires being critical about our own attempts at criticism. Russell observes, for example, that refutations are rarely final; they are usually a prelude to further refinements.(10) He also notes, anticipating a recent objection that critical thinking texts restrict criticism to "approved" topics, that punishment awaits those who wander into unconventional fields of criticism.(11) For Russell, critical thinking must include critical reflection on what passes for critical thinking. Third, critical thinking is not essentially a negative enterprise, witness Russell's emphasis on constructive doubt, and his warning against practices which lead to children becoming destructively critical.(12) **Russell maintains that the kind of criticism aimed at is not that which seeks to reject, but that which considers apparent knowledge on its merits, retaining whatever survives critical scrutiny.**

There is a pervasive emphasis in Russell's writings, as in much recent commentary, on the reasons and evidence which support, or undermine, a particular belief. Critical scrutiny of these is needed to determine the degree of confidence we should place in our beliefs. **He emphasizes the need to teach the skill of marshalling evidence if a critical habit of mind is to be fostered, and suggests that one of the most important, yet neglected, aspects of education is learning how to reach true conclusions on insufficient data.**(13) This emphasis on reasons, however, does not lead Russell to presuppose the existence of an infallible faculty of rationality. Complete rationality, he observes, is an unattainable ideal; rationality is a matter of degree.(14) Far from having an uncritical belief in rationality, he was even prepared to say, somewhat facetiously, that philosophy was an unusually ingenious attempt to think fallaciously!

The mere possession of critical skills is insufficient to make one a critical thinker. Russell calls attention to various dispositions which mean that the relevant skills are actually exercised. Typically, he uses the notion of habit (sometimes the notion of practice) to suggest the translation of skills into actual behavior. **Russell describes education as the formation, by means of instruction, of certain mental habits [and a certain outlook on life and the world].**(15) He mentions, in particular:

- (i) the habit of impartial inquiry,(16) which is necessary if one-sided opinions are not to be taken at face value, and if people are to arrive at conclusions which do not depend solely on the time and place of their education;

- (ii) **the habit of weighing evidence,(17) coupled with the practice of not giving full assent to propositions which there is no reason to believe true;**
- (iii) the habit of attempting to see things truly,(18) which contrasts with the practice of merely collecting whatever reinforces existing prejudice; and
- (iv) the habit of living from one's own centre,(19) which Russell describes as a kind of self-direction, a certain independence in the will.

Such habits, of course, have to be exercised intelligently. Russell recognizes clearly, indeed it is a large part of the problem which critical thinking must address, that one becomes a victim of habit if the habitual beliefs of one's own age constitute a prison of prejudice. Hence the need for a critical habit of mind.

Because they are not simply automatic responses in which one has been drilled, such intellectual habits in effect reflect a person's willingness, what Russell typically calls one's readiness, to act and respond in various ways. His examples include:

- (i) **a readiness to admit new evidence against previous beliefs,(20) which involves an open-minded acceptance (avoiding credulity) of whatever a critical examination has revealed;**
- (ii) **a readiness to discard hypotheses which have proved inadequate,(21) where the test is whether or not one is prepared in fact to abandon beliefs which once seemed promising; and**
- (iii) **a readiness to adapt oneself to the facts of the world,(22) which Russell distinguishes from merely going along with whatever happens to be in the ascendant, which might be evil.**

To be ready to act, or react, in these ways suggests both an awareness that the habits in question are appropriate and a principled commitment to their exercise. They have in common the virtue Russell called truthfulness, which entails the wish to find out, and trying to be right in matters of belief.(23)

In Russell's conception, beyond the skills and dispositions outlined above, a certain set of attitudes characterizes the outlook of a critical person. By the critical attitude, Russell means a temper of mind central to which is a certain stance with respect to knowledge and opinion which involves:

- (i) **a realization of human fallibility, a sense of the uncertainty of many things commonly regarded as indubitable, bringing with it humility;(24)**
- (ii) **an open-minded outlook with respect to our beliefs, an "inward readiness" to give weight to the other side, where every question is regarded as open**

and where it is recognized that what passes for knowledge is sure to require correction;(25)

- (iii) a refusal to think that our own desires and wishes provide a key to understanding the world, recognizing that what we should like has no bearing whatever on what is;(26)**
- (iv) being tentative,(27) without falling into a lazy skepticism (or dogmatic doubt), but holding one's beliefs with the degree of conviction warranted by the evidence.**

Russell defends an outlook midway between complete skepticism and complete dogmatism in which one has a strong desire to know combined with great caution in believing that one knows. Hence his notion of critical undogmatic receptiveness which rejects certainty (the demand for which Russell calls an intellectual vice(28)) and ensures that open-mindedness does not become mindless.

Russell describes critical undogmatic receptiveness as the true attitude of science, and often speaks of the scientific outlook, the scientific spirit, the scientific temper, a scientific habit of mind and so on, but Russell does not believe that critical thinking is only, or invariably, displayed in science. It is clear that Russell is suggesting a certain ideal to which science can only aspire but which, in his view, science exemplifies to a greater extent than philosophy, at least philosophy as practiced in the early twentieth century. Russell uses a number of other phrases to capture the ideal of critical thinking, including the philosophic spirit and a philosophical habit of mind, the liberal outlook (or even the liberal creed), and the rational temper. All of these ideas are closely intertwined. He remarks, for example, that the scientific outlook is the intellectual counterpart of what is, in the practical sphere, the outlook of liberalism. The critical outlook, for Russell, reflects an epistemological and ethical perspective which emphasizes: (i) how beliefs are held, i.e., not dogmatically, (ii) the doubtfulness of all beliefs, (iii) the belief that knowledge is difficult but not impossible, (iv) freedom of opinion, (v) truthfulness, and (vi) tolerance.

Russell's account of critical thinking is itself a critical one. It is not rendered naive by postmodern doubts about enlightenment notions, doubts which Russell would regard as dogmatic. With respect to both skills and dispositions, for example, Russell does stress impartiality, but he is acutely aware of, and emphasizes, the problems which readily frustrate the realization of this ideal. No one can view the world with complete impartiality, Russell notes, but a continual approach is possible. He speaks of controlling our biases, but at the same time is quick to observe that "one's bias may be too profound to be conscious."(29) He concedes that even scientific articles (for example, about the effects of alcohol) will generally betray the writer's bias. He notes that it is very easy to become infected by prejudice and speaks of having to struggle against it. Russell admits that his account of the critical attitude may seem nothing more than a trite truism, but keeping it in mind, and adhering to it, especially

as far as our own biases are concerned, is not at all easy. As with his conviction about the attainability of knowledge, and unlike many contemporary skeptics, Russell defends the ideal of impartiality and offers practical advice to anyone who takes this elusive ideal seriously. We can try to hear all sides and discuss our views with people who have different biases, making sure to face real opponents; we can stretch our minds by trying to appreciate alternative pictures of the world presented in philosophy, anthropology and history; we can learn to recognize our own biases by, for example, noting when contrary opinions make us angry. And so on.

Russell attaches considerable importance to forming one's own opinions, and this might seem to betray an unwarranted confidence in an individual's ability to avoid dependence on expert knowledge, an issue which recent discussions concerning trust in knowledge have brought to the fore. **Russell's concern is that "with modern methods of education and propaganda it has become possible to indoctrinate a whole population with a philosophy which there is no rational ground to suppose true;"**(30) hence his emphasis on thinking for oneself. He is not, however, blind to the value of expert knowledge. He maintains that expert opinion, when unanimous, must be accepted by non-experts as more likely to be right than the opposite opinion. One of his famous principles is that "when the experts are agreed, the opposite opinion cannot be regarded as certain." It cannot be regarded as certain, but it may prove to be correct since the experts, despite their agreement, may be mistaken. Hence we need to maintain our critical guard and an open-minded outlook. Russell observes that an economist should form an independent judgment on currency questions, but an ordinary mortal had better follow authority. There remains some scope, however, for one's own critical judgment even with respect to expert, or supposed expert, pronouncements. **Learning not to be taken in by eloquence is part of learning to recognize who speaks with real authority.** Russell also believes that non-specialists can learn to distinguish the genuine expert from cocksure prophets and dishonest charlatans, and in the case of doubt a critical person can and should suspend judgment.

It is sometimes objected against influential accounts of critical thinking that there is little or no mention of the feelings and relational skills which go beyond opening the mind to include opening one's heart to the world and to other people. This feminist critique does not, I believe, apply to Russell; indeed he anticipates this very criticism of critical thinking: "Schools . . . will turn out pupils whose minds are closed against reason and whose hearts have been taught to be deaf to humane feeling."(31) Elsewhere, speaking of an education designed to undermine dogmatism, Russell says plainly: **"What is needed is not merely intellectual. A widening of sympathy is at least as important."**(32) Again, far from the hostility and aggressiveness which is sometimes associated with critical thinking, and thought to make it gender biased, Russell advises that "in studying a philosopher, the right attitude is neither reverence nor contempt, but first a kind of hypothetical sympathy. . . ." (33) Russell here anticipates what is called "the believing game" (by contrast with "the doubting game"), where one tries to discover, as Russell puts it, what it feels like to believe in the ideas in question before one attempts to overturn them.

Furthermore, Russell is not open to the objection, also raised against recent accounts of critical thinking, that the paradigm encourages one to lose touch with one's own personal voice, detaching and objectifying that voice in a misguided quest for Truth and Certainty. Russell himself disparages the tendency to use "truth" with a big T in the grand sense. People persecute each other because they believe they know the "Truth".(34) Although Russell thinks that there is a danger in passionate belief (**in general he holds that the passionateness of a belief is inversely proportional to the evidence in its favor!**), he does not advocate an attitude of complete detachment because he believes that detachment will lead to inaction.(35) The kind of detachment he favors is from those emotions (hatred, envy, anger and so on) which interfere with intellectual honesty and which prevent the emergence of kindly feeling.(36) **The person who has no feelings, he says, does nothing and achieves nothing.** Here again, Russell anticipates the recent objection that critical thinking may lead to people becoming spectators rather than participants. The philosopher is not a merely skeptical spectator of human activities.(37) **We need, Russell says, to learn to live without certainty, yet without being paralyzed by hesitation.** He advocates living from one's own centre, but warns against subjective certainty. **Many have gone to war with the certainty that they would survive, Russell observes, but death paid no heed to their certainty.**

Finally, it is worth noting that Russell avoids the "philosopher's fallacy" of exaggerating the role of philosophy and logic in the development of critical thinking to the neglect of subject knowledge. Certainly Russell thinks that philosophy has much to contribute, especially to learning the value of suspended judgment – no doubt because philosophy is so full of controversy and uncertainty. Moreover, Russell is not nearly so dismissive of informal logic as some recent critics; clear logical thinking has a definite part to play.(38) It is useful, Russell thinks, to study informal fallacies and to have good names for them, such as the "pigs-might-fly" fallacy.(39) In giving an example of this fallacy from physics, Russell seems to agree with those who hold that such principles of reasoning are subject-neutral and generalizable. **Having said this, however, it is important to recall that Russell does not equate critical thinking with logical proficiency.** Logic and mathematics are the alphabet of the book of nature, not the book itself. **Russell also makes it clear in many places that it is one thing to know, for example, the principle that belief should be proportioned to the evidence, and quite another to know what the actual evidence is.** Russell, as we have seen, stresses access to impartial sources of knowledge; without such access, our critical abilities cannot function. He is not, therefore, to be convicted of a simplistic view about the generalizability of critical thinking.(40)

Notes

(1) Noam Chomsky, "Toward a humanistic conception of education", in Walter Feinberg and Henry Rosemont, Jr. (eds.), *Work, Technology and Education* (Urbana, University of Illinois Press, 1975: 204-20); Howard Woodhouse, "The concept of growth in Bertrand Russell's educational thought", *Journal of Educational Thought* 17, 1, 1983: 12-22; Philip Stander, "Bertrand Russell on the aims of education", *Educational Forum* 38, 4, 1974: 445-56.

(2) Relevant papers include: “The place of science in a liberal education” (1913), “Free thought and official propaganda” (1922), “The value of free thought” (1944), “Education for democracy” (1939), “The functions of a teacher” (1940), “How to become a philosopher” (1942), “Philosophy for laymen” (1946), and “Freedom and the philosopher” (1951). Relevant books include: *The Problems of Philosophy* (1912), *Principles of Social Reconstruction* (1916), *On Education* (1926), *Skeptical Essays* (1928), *Education and the Social Order* (1932), *Unpopular Essays* (1950), and *Why I Am Not A Christian* (1957).

(3) Russell remarks that philosophy is merely the attempt to answer ultimate questions critically. See Russell, *The Problems of Philosophy* (London: Oxford University Press, 1973: 1). And he observes that critical undogmatic receptiveness is the true attitude of science. See “Free thought and official propaganda”, in *Skeptical Essays* (London, Unwin, 1985: 117).

(4) Russell, “John Stuart Mill”, in *Portraits From Memory* (London, Allen and Unwin, 1956: 131).

(5) Russell, “Education for democracy”, *Addresses and Proceedings of the National Education Association* 77, July 2-6, 1939: 530. See also “Philosophy for laymen”, in *Unpopular Essays* (London, George Allen and Unwin, 1950: 47).

(6) Russell, “A plea for clear thinking”, in *Portraits From Memory, op. cit.*: 174. See also “Free thought and official propaganda”, in *Skeptical Essays, op. cit.*: 116.

(7) Russell, *Philosophy* (New York, W. W. Norton, 1927: 299). See also *Principles of Social Reconstruction* (London, Unwin, 1971: 108).

(8) Russell, “Philosophy”, in John G. Slater (ed.), *The Collected Papers of Bertrand Russell Vol. 11* (London, Routledge, 1997: 223. (Incomplete paper, probably written in 1945. Emphasis in original.)

(9) See, for example, Robert H. Ennis, “A taxonomy of critical thinking dispositions and abilities”, in Joan Boykoff Baron and Robert J. Sternberg (eds.), *Teaching Thinking Skills: Theory and Practice* (New York, W. H. Freeman, 1987: 9-26).

(10) Russell, *History of Western Philosophy* (London, George Allen and Unwin, 1961: 69). Another clear example is Russell’s remark that “the liberal philosopher will wish all beliefs to be open to discussion, including the belief that all beliefs should be open to discussion.” See “Freedom and the philosopher”, in *Collected Papers Vol. 11, op. cit.*: 418-21.

(11) Russell, “Freedom and the colleges”, in *Why I Am Not A Christian* (New York, Simon and Schuster, 1965: 181).

(12) Russell, *Principles of Social Reconstruction* (London, Unwin, 1971: 107-8).

(13) Russell, *Education and the Social Order* (London, Unwin, 1977: 141).

(14) Russell, “Can men be rational?”, in *Skeptical Essays, op. cit.*: 41.

(15) Russell, “The place of science in a liberal education”, in *Mysticism and Logic* (Harmondsworth, Penguin, 1953: 41). I shall take up the idea of “a certain outlook” subsequently.

(16) Russell, “The functions of a teacher”, in *Unpopular Essays, op. cit.*: 151.

(17) Russell, “Free thought and official propaganda”, in *Skeptical Essays, op. cit.*: 126.

(18) Russell, “Human character and social institutions”, in Richard A. Rempel et al. (eds.), *The Collected Papers of Bertrand Russell Vol. 14*, (London: Routledge, 1995: 419-25).

- (19) Russell, "Human character and social institutions", *ibid.*: 421.
- (20) Russell, "Freedom versus authority in education", in *Skeptical Essays*, *op. cit.*: 149.
- (21) Russell, "Free thought and official propaganda", in *Skeptical Essays*, *op. cit.*: 116
- (22) Russell, "Hopes: realized and disappointed", in *Portraits From Memory*, *op. cit.*: 47.
- (23) Russell, "The value of free thought", in *Understanding History* (New York: Philosophical Library, 1957: 73).
- (24) Russell, "A philosophy for our time", in *Portraits From Memory*, *op. cit.*: 167. For the comment on humility, see Russell, *Our Knowledge of the External World* (New York: Mentor, 1960: 186). Russell also notes the theory-laden character of observation. See his comment in *Philosophy*, *op. cit.*: 170.
- (25) Russell, *On Education* (London: Unwin, 1960: 43, 134) and Russell, "Free thought and official propaganda", in *Skeptical Essays*, *op. cit.*: 116.
- (26) Russell, "The place of science in a liberal education", in *Mysticism and Logic*, *op. cit.*: 46. And "What I believe", in *Why I Am Not A Christian*, *op. cit.*: 54.
- (27) Russell, "Free thought and official propaganda", in *Skeptical Essays*, *op. cit.*: 116.
- (28) Russell, "Philosophy for laymen", in *Unpopular Essays*, *op. cit.*: 42.
- (29) Russell, "My own philosophy", in *Collected Papers Vol. 11*, *op. cit.*: 69.
- (30) Russell, "Philosophy", in *Collected Papers Vol. 11*, *op. cit.*: 233. (An incomplete paper circa 1945, perhaps building on the similarly titled paper cited in fn. 8 above.)
- (31) Russell, "The duty of a philosopher in this age", in *Collected Papers Vol. 11*, *op. cit.*: 462.
- (32) Russell, "The spirit of inquiry", in *Collected Papers Vol. 11*, *op. cit.*: 435. (Previously unpublished answers to a questionnaire, written in 1953.)
- (33) Russell, *History of Western Philosophy*, *op. cit.*: 58. This point is acknowledged by Blythe McVicker Clinchy, "On critical thinking and connected knowing", in Kerry S. Walters (ed.), *Re-Thinking Reason* (New York: SUNY, 1994: 33-42).
- (34) Russell, *Philosophy*, *op. cit.*: 254. And "Philosophy in the twentieth century", in *Skeptical Essays*, *op. cit.*: 49.
- (35) Russell, "The spirit of inquiry", in *Collected Papers Vol. 11*, *op. cit.*: 433.
- (36) Russell, "Rewards of philosophy", in *Collected Papers Vol. 11*, *op. cit.*: 276.
- (37) Russell, "Le philosophe en temps de crise", in *Collected Papers Vol. 11*, *op. cit.*: 415.
- (38) Russell, "A plea for clear thinking", in *Portraits From Memory*, *op. cit.*: 175.
- (39) Russell, review of Rupert Crawshay-Williams, *The Comforts of Unreason*, in *Collected Papers Vol. 11*, *op. cit.*: 323-7.
- (40) See my "Content and criticism: the aims of schooling", *Journal of Philosophy of Education* 29, 1, 1995: 47-60.

Finally for this “introductory survey” of “critical- (or evaluative- or scientific-) thinking skills”, Dear, I think it would be useful to quote the following article to show you that such ideas have a long and illustrious history. This article⁸ [to which I’ve added a couple of notes in brackets] is “taken from *The California Teacher Preparation for Instruction in Critical Thinking: Research Findings and Policy Recommendations* (State of California, California Commission on Teacher Credentialing, Sacramento, CA, March 1997).” The “principal authors” are stated to be: Richard Paul, Linda Elder, and Ted Bartell.

A Brief History of the Idea of Critical Thinking

The intellectual roots of critical thinking are as ancient as its etymology,⁹ traceable, ultimately [and in the West], to the teaching practice and vision of Socrates 2,500 years ago who discovered by a method of probing questioning that people could not rationally justify their confident claims to knowledge. Confused meanings, inadequate evidence, or self-contradictory beliefs often lurked beneath smooth but largely empty rhetoric. Socrates established the fact that one cannot depend upon those in “authority” to have sound knowledge and insight. He demonstrated that persons may have power and high position and yet be deeply confused and irrational. He established the importance of asking deep questions that probe profoundly into thinking before we accept ideas as worthy of belief.

He established the importance of seeking evidence, closely examining reasoning and assumptions, analyzing basic concepts, and tracing out implications not only of what is said but of what is done as well. His method of questioning is now known as “Socratic questioning” and is the best known critical thinking teaching strategy. In his mode of questioning, Socrates highlighted the need in thinking for clarity and logical consistency.

Socrates set the agenda for the tradition of critical thinking, namely, to reflectively question common beliefs and explanations, carefully distinguishing those beliefs that are reasonable and logical from those which – however appealing they may be to our native egocentrism, however much they serve our vested interests, however comfortable or comforting they may be – lack adequate evidence or rational foundation to warrant our belief.

Socrates’ practice was followed by the critical thinking of Plato (who recorded Socrates’ thought), Aristotle, and the Greek skeptics, all of whom emphasized that

⁸ Available at <http://www.criticalthinking.org/aboutCT/briefHistoryCT.shtml>.

⁹ As you can find at <http://www.viterbo.edu/personalpages/faculty/RRuppel/CritThink.html>: “The etymology of critical thinking goes back to the Greek word for ‘critic’, *Kritike*, the art of judgment.”

things are often very different from what they appear to be and that only the trained mind is prepared to see through the way things look to us on the surface (delusive appearances) to the way they really are beneath the surface (the deeper realities of life). From this ancient Greek tradition emerged the need, for anyone who aspired to understand the deeper realities, to think systematically, to trace implications broadly and deeply, for only thinking that is comprehensive, well-reasoned, and responsive to objections can take us beyond the surface.

In the middle ages, the tradition of systematic critical thinking was embodied in the writings and teachings of such thinkers as Thomas Aquinas (*Summa Theologica*) who to ensure his thinking met the test of critical thought, always systematically stated, considered, and answered all criticisms of his ideas as a necessary stage in developing them. Aquinas heightened our awareness not only of the potential power of reasoning but also of the need for reasoning to be systematically cultivated and “cross-examined.” Of course, Aquinas’ thinking also illustrates that those who think critically do not always reject established beliefs, only those beliefs that lack reasonable foundations. [Because Aquinas never took the essential step to compare reasoned results with data!]

In the Renaissance (15th and 16th Centuries), a flood of scholars in Europe began to think critically about religion, art, society, human nature, law, and freedom. They proceeded with the assumption that most of the domains of human life were in need of searching analysis and critique. Among these scholars were Colet, Erasmus, and [Sir Thomas] More in England. They followed up on the insight of the ancients.

Francis Bacon, in England, was explicitly concerned with the way we misuse our minds in seeking knowledge. He recognized explicitly that the mind cannot safely be left to its natural tendencies. In his book *The Advancement of Learning*, he argued for the importance of studying the world empirically. He laid the foundation for modern science with his emphasis on the information-gathering processes. He also called attention to the fact that most people, if left to their own devices, develop bad habits of thought (which he called “idols”) that lead them to believe what is false or misleading. He called attention to “Idols of the tribe” (the ways our mind naturally tends to trick itself), “Idols of the market-place” (the ways we misuse words), “Idols of the theater” (our tendency to become trapped in conventional systems of thought), and “Idols of the schools” (the problems in thinking when based on blind rules and poor instruction). His book could be considered one of the earliest texts in critical thinking, for his agenda was very much the traditional agenda of critical thinking.

Some fifty years later in France, Descartes wrote what might be called the second text in critical thinking, *Rules For the Direction of the Mind*. In it, Descartes argued for the need for a special systematic disciplining of the mind to guide it in thinking. He articulated and defended the need in thinking for clarity and precision. He developed a method of critical thought based on the principle of systematic doubt. He emphasized the need to base thinking on well-thought through foundational

assumptions. Every part of thinking, he argued, should be questioned, doubted, and tested.

In the same time period, Sir Thomas More developed a model of a new social order, *Utopia*, in which every domain of the present world was subject to critique. His implicit thesis was that established social systems are in need of radical analysis and critique. The critical thinking of these Renaissance and post-Renaissance scholars opened the way for the emergence of science and for the development of democracy, human rights, and freedom for thought.

In the Italian Renaissance, Machiavelli's *The Prince* critically assessed the politics of the day, and laid the foundation for modern critical political thought. He refused to assume that government functioned as those in power said it did. Rather, he critically analyzed how it did function and laid the foundation for political thinking that exposes both, on the one hand, the real agendas of politicians and, on the other hand, the many contradictions and inconsistencies of the hard, cruel, world of the politics of his day.

Hobbes and Locke (in 16th and 17th Century England) displayed the same confidence in the critical mind of the thinker that we find in Machiavelli. Neither accepted the traditional picture of things dominant in the thinking of their day. Neither accepted as necessarily rational that which was considered "normal" in their culture. Both looked to the critical mind to open up new vistas of learning. Hobbes adopted a naturalistic view of the world in which everything was to be explained by evidence and reasoning. Locke defended a common sense analysis of everyday life and thought. He laid the theoretical foundation for critical thinking about basic human rights and the responsibilities of all governments to submit to the reasoned criticism of thoughtful citizens.

It was in this spirit of intellectual freedom and critical thought that people such as Robert Boyle (in the 17th Century) and Sir Isaac Newton (in the 17th and 18th Century) did their work. In his *Skeptical Chymist*, Boyle severely criticized the chemical theory that had preceded him. Newton, in turn, developed a far-reaching framework of thought which roundly criticized the traditionally accepted worldview. He extended the critical thought of such minds as Copernicus, Galileo, and Kepler. After Boyle and Newton, it was recognized by those who reflected seriously on the natural world that egocentric views of world must be abandoned in favor of views based entirely on carefully gathered evidence and sound reasoning.

Another significant contribution to critical thinking was made by the thinkers of the French enlightenment: Bayle, Montesquieu, Voltaire, and Diderot. They all began with the premise that the human mind, when disciplined by reason, is better able to figure out the nature of the social and political world. What is more, for these thinkers, reason must turn inward upon itself, in order to determine weaknesses and strengths of thought. They valued disciplined intellectual exchange, in which all views had to be submitted to serious analysis and critique. They believed that all

authority must submit in one way or another to the scrutiny of reasonable critical questioning.

Eighteenth Century thinkers extended our conception of critical thought even further, developing our sense of the power of critical thought and of its tools. Applied to the problem of economics, it produced Adam Smith's *Wealth of Nations*. In the same year, applied to the traditional concept of loyalty to the king, it produced the *Declaration of Independence*. Applied to reason itself, it produced Kant's *Critique of Pure Reason*.

In the 19th Century, critical thought was extended even further into the domain of human social life by Comte and Spencer. Applied to the problems of capitalism, it produced the searching social and economic critique of Karl Marx. Applied to the history of human culture and the basis of biological life, it led to Darwin's *Descent of Man*. Applied to the unconscious mind, it is reflected in the works of Sigmund Freud. Applied to cultures, it led to the establishment of the field of anthropological studies. Applied to language, it led to the field of Linguistics and to many deep probings of the functions of symbols and language in human life.

In the 20th Century, our understanding of the power and nature of critical thinking has emerged in increasingly more explicit formulations. In 1906, William Graham Sumner published a land-breaking study of the foundations of sociology and anthropology, *Folkways*, in which he documented the tendency of the human mind to think sociocentrically and the parallel tendency for schools to serve the (uncritical) function of social indoctrination:

“Schools make persons all on one pattern, orthodoxy. School education, unless it is regulated by the best knowledge and good sense, will produce men and women who are all of one pattern, as if turned in a lathe... An orthodoxy is produced in regard to all the great doctrines of life. It consists of the most worn and commonplace opinions which are common in the masses. The popular opinions always contain broad fallacies, half-truths, and glib generalizations (p. 630).

At the same time, Sumner recognized the deep need for critical thinking in life and in education:

“Criticism is the examination and test of propositions of any kind which are offered for acceptance, in order to find out whether they correspond to reality or not. The critical faculty is a product of education and training. It is a mental habit and power. It is a prime condition of human welfare that men and women should be trained in it. It is our only guarantee against delusion, deception, superstition, and misapprehension of ourselves and our earthly circumstances. Education is good just so far as it produces well-developed critical faculty... A teacher of any subject who insists on accuracy and a rational control of all processes and methods, and who holds everything open to unlimited verification and revision is cultivating that method as a habit in the pupils. Men educated in

it cannot be stampeded... They are slow to believe. They can hold things as possible or probable in all degrees, without certainty and without pain. They can wait for evidence and weigh evidence... They can resist appeals to their dearest prejudices... Education in the critical faculty is the only education of which it can be truly said that it makes good citizens (pp. 632, 633).” [Italics added.]

John Dewey agreed. From his work, we have increased our sense of the pragmatic basis of human thought (its instrumental nature), and especially its grounding in actual human purposes, goals, and objectives. From the work of Ludwig Wittgenstein we have increased our awareness not only of the importance of concepts in human thought, but also of the need to analyze concepts and assess their power and limitations. From the work of Piaget, we have increased our awareness of the egocentric and sociocentric tendencies of human thought and of the special need to develop critical thought which is able to reason within multiple standpoints, and to be raised to the level of “conscious realization.” From the massive contribution of all the “hard” sciences, we have learned the power of information and the importance of gathering information with great care and precision, and with sensitivity to its potential inaccuracy, distortion, or misuse. From the contribution of depth-psychology, we have learned how easily the human mind is self-deceived, how easily it unconsciously constructs illusions and delusions, how easily it rationalizes and stereotypes, projects and scapegoats.

To sum up, the tools and resources of the critical thinker have been vastly increased in virtue of the history of critical thought. Hundreds of thinkers have contributed to its development. Each major discipline has made some contribution to critical thought. Yet for most educational purposes, it is the summing up of base-line common denominators for critical thinking that is most important. Let us consider now that summation.

The Common Denominators of Critical Thinking Are the Most Important By-products of the History of Critical Thinking

We now recognize that critical thinking, by its very nature, requires, for example, the systematic monitoring of thought, that thinking, to be critical, must not be accepted at face value but must be analyzed and assessed for its clarity, accuracy, relevance, depth, breadth, and logicalness. We now recognize that critical thinking, by its very nature, requires, for example, the recognition that all reasoning occurs within points of view and frames of reference, that all reasoning proceeds from some goals and objectives, has an informational base, that all data when used in reasoning must be interpreted, that interpretation involves concepts, that concepts entail assumptions, and that all basic inferences in thought have implications. We now recognize that each of these dimensions of thinking need to be monitored and that problems of thinking can occur in any of them.

The result of the collective contribution of the history of critical thought is that the basic questions of Socrates can now be much more powerfully and focally framed

and used. In every domain of human thought, and within every use of reasoning within any domain, it is now possible to question:

- ends and objectives,
- the status and wording of questions,
- the sources of information and fact,
- the method and quality of information collection,
- the mode of judgment and reasoning used,
- the concepts that make that reasoning possible,
- the assumptions that underlie concepts in use,
- the implications that follow from their use, and
- the point of view or frame of reference within which reasoning takes place.

In other words, questioning that focuses on these fundamentals of thought and reasoning are now baseline in critical thinking. It is beyond question that intellectual errors or mistakes can occur in any of these dimensions, and that students need to be fluent in talking about these structures and standards.

Independent of the subject studied, students need to be able to articulate thinking about thinking that reflects basic command of the intellectual dimensions of thought: “Let’s see, what is the most fundamental issue here? From what point of view should I approach this problem? Does it make sense for me to assume this? From these data may I infer this? What is implied in this graph? What is the fundamental concept here? Is this consistent with that? What makes this question complex? How could I check the accuracy of these data? If this is so, what else is implied? Is this a credible source of information?, etc., etc...”

With intellectual language such as this in the foreground, students can now be taught at least minimal critical thinking moves within any subject field. What is more, there is no reason in principle that students cannot take the basic tools of critical thought which they learn in one domain of study and extend it (with appropriate adjustments) to all the other domains and subjects which they study. For example, having questioned the wording of a problem in math, I am more likely to question the wording of a problem in the other subjects I study.

As a result of the fact that students can learn these generalizable critical thinking moves, they need not be taught history simply as a body of facts to memorize; they can now be taught history as historical reasoning. Classes can be designed so that students learn to think historically and develop skills and abilities essential to historical thought. Math can be taught so that the emphasis is on mathematical reasoning. Students can learn to think geographically, economically, biologically, chemically, in courses within these disciplines. In principle, then, all students can be taught so that they learn how to bring the basic tools of disciplined reasoning into every subject they study...

I agree with the authors that such thinking skills can [theoretically!] be learned from and should be applied to every subject and certainly I agree with William Graham Sumner (whose book the authors quote) that “Education in the critical faculty is the only education of which it can be truly said that it makes good citizens.” There are, however, significant and serious obstacles to the practical realization of such goals, as I’ll try to show you in the next chapter – after you get some eXercise!