



# Critical Thinking

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# What is "Critical" in Critical Thinking?

**κριτικός** (Kritikos), relating to judging, fit for judging, skilled in judging, able to discern (Plato, Plutarch, Lucian, others). With the genitive of the object, for example:  
κριτικός ἐνθυμήσεων καὶ ἐννοιῶν καρδίας - able to judge the thoughts and intentions of the heart.



**Mechanical Thinking**  
(statements that stop thought)



**Critical Thinking**  
(questions that start thought)

"I'm not good at math."

"How can I improve my math skills?"

"That's not the way Mrs. Jones taught us."

"How many ways are there to do this?"

"There was only one reason for the Civil War."

"What different factors led to the Civil War?"

"Current Events is boring."

"How do events right now shape my future?"

"Our group never accomplishes anything."

"Why is our group getting hung up?"

# What is "Critical" in Critical Thinking?

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## Definition of critical

b :[crucial](#), [decisive](#) a critical test

c :[indispensable](#), [vital](#) a component critical to the operation of a machine

d :being in or approaching a state of crisis a critical shortage

a critical situation

2 a :inclined to [criticize](#) severely and unfavorably

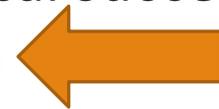


**Not** what we mean by "critical" in critical thinking

b :consisting of or involving [criticism](#) critical writings

; also :of or relating to the judgment of [critics](#) The play was a critical success.

**c :exercising or involving careful judgment or judicious evaluation**



What we mean by "critical" in critical thinking

# Attitude + Knowledge + Thinking Skills = Critical Thinking

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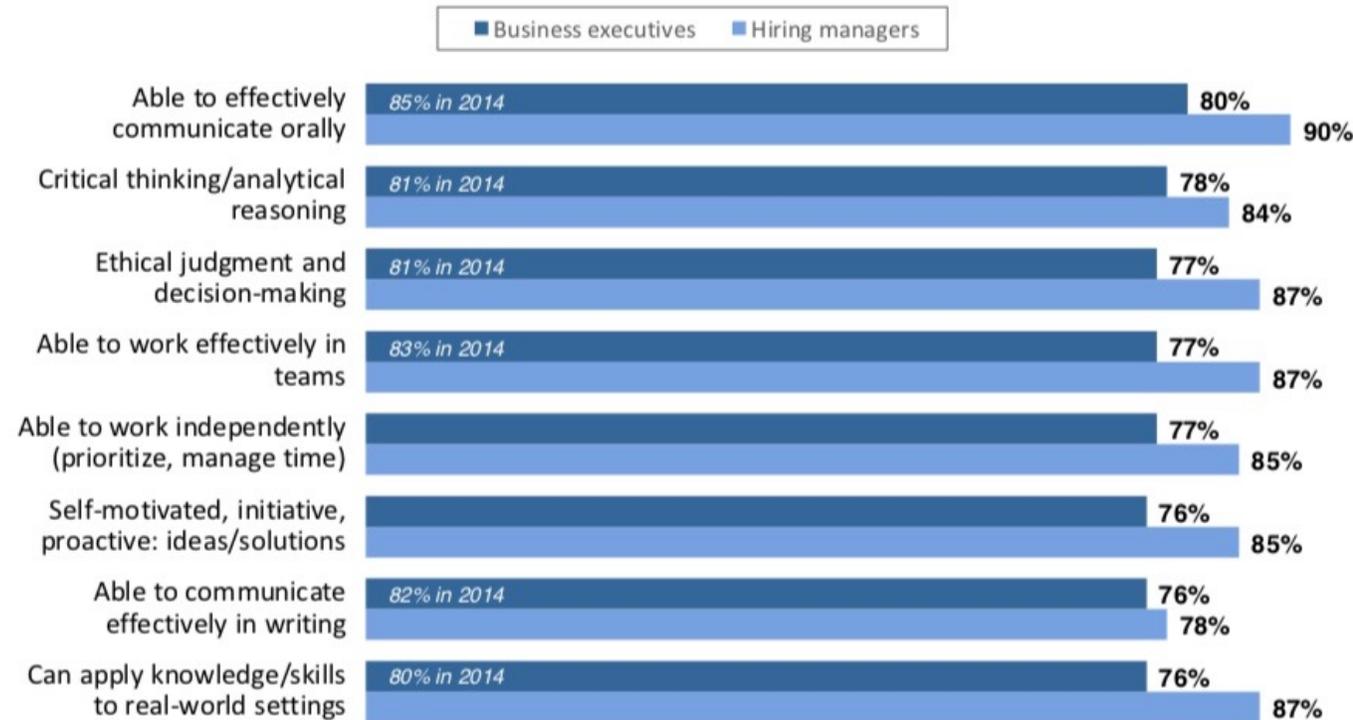
“Proficiency in reading, writing, and arithmetic has traditionally been the entry-level threshold to the job market, but the new workplace requires more from its employees. Employees need to think critically, solve problems, innovate, collaborate, and communicate more effectively.”

— American Management Association, 2010 (quoted in Diane Halper: Thought and Knowledge, page 5.)

# Integrative Learning: Hart Research Associates Study, 2018\*

The learning priorities that executives and hiring managers value most highly cut across majors.

*Very Important\* Skills for Recent College Graduates We Are Hiring*



\* 8-10 ratings on a 0-to-10 scale; 15 outcomes tested

\* <https://www.aacu.org/sites/default/files/files/LEAP/2018EmployerResearchReport.pdf>

# Critical Thinking

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“All men by nature desire to  
know.”

Aristotle

Metaphysics, Book 1,



# Francis Bacon's "Four Idols"



## 1. The idols of the clan.

are deceptive beliefs inherent in the mind of man, and therefore belonging to the whole of the human race.

## 2. The idols of the cave.

are those which arise within the mind of the individual. The thoughts of the individual roam about in this dark cave and are variously modified by temperament, education, habit, environment, and accident. Thus an individual who dedicates his mind to some particular branch of learning becomes possessed by his own peculiar interest, and interprets all other learning according to the colors of his own devotion.

## 3. The idols of the marketplace.

are errors arising from the false significance bestowed upon words, and in this classification Bacon anticipated the modern science of semantics. According to him it is the popular belief that men form their thoughts into words in order to communicate their opinions to others, but often words arise as substitutes for thoughts and men think they have won an argument because they have out talked their opponents.

## 4. The idols of the theater.

are those which are due to sophistry and false learning. These idols are built up in the field of theology, philosophy, and science, and because they are defended by learned groups are accepted without question by the masses.

# Critical Thinking, Defined

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“Critical thinking is the process of purposeful, reflective judgment. Critical thinking manifests itself in giving reasoned and fair-minded consideration to *evidence, conceptualizations, methods, contexts, and standards* in order to decide what to believe or what to do.”

*(Facione, 2010).*

“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” *(Scriven and Paul, 1987).*

# Critical Thinking: The Challenge

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**“The problem isn’t that  
Johnny can’t read.**

**The problem isn’t even  
that Johnny can’t think.**

**The problem is that  
Johnny doesn’t know what  
thinking is; he confuses  
it with feeling.”**

**–THOMAS SOWELL**



# Critical Thinking: The Challenge

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# Critical Thinking, Defined

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“It is the mark of an educated mind to be able to entertain a thought without accepting it.”

— *Aristotle, Metaphysics*

“All that we are is the result of what we have thought: it is founded on our thoughts and made up of our thoughts.”

— *Buddha, Dhammapada*

“Learning without thought is labor lost; thought without learning is perilous”

— *Confucius, Analects*

“The knowledge of anything, since all things have causes, is not acquired or complete unless it is known by its causes.”

– *Avicenna (Ibn Sina), On Medicine*

“Read not to contradict and confute; nor to believe and take for granted; nor to find talk and discourse; but to weigh and consider”

— *Francis Bacon, Of Studies*

“Don't take shadows too seriously. Reality is your only safety. Continue to reject illusion.”

— *Wole Soyinka, Critical Perspectives on Wole Soyinka*



# Critical Thinking Mindset: Eagerness and Skills

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“A person with a strong *disposition* toward critical thinking has the consistent internal motivation to engage problems and make decisions by critical thinking. Operationally this means three things: The person consistently *values* critical thinking, *believes* that using critical thinking skills offers the greatest promise for reaching good judgments, and *intends* to approach problems and decisions by applying critical thinking skills as best as he or she can. This combination of values, beliefs, and intentions forms the habits of mind that dispose the person toward critical thinking.”

— Peter Facione, Think Critically, Chapter 2.1



# Critical Thinking Mindset: Eagerness and Skills

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“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”

— Richard Paul and Linda Elder, Critical Thinking Concepts and Tools, pg. 2

# Critical Thinking Mindset: Eagerness and Skills

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Universal Intellectual Standards:

**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?

**Precision:** Could you give me more details? Could you be more specific?

**Relevance:** How is that connected to the question? How does that bear on the issue?



# Critical Thinking Mindset: Eagerness and Skills

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## Universal Intellectual Standards<sup>(cont'd)</sup>

**Depth:** How does your answer address the complexities in the question? How are you taking into account the problems in the question? Are you 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 the point of view of X?

**Logic:** Does this really make sense? Does this follow from what you said? How does that follow?

**Fairness:** Are we considering all relevant viewpoints in good faith? Are we distorting some information to maintain our biased perspective? Are we more interested in our vested interests than the common good?

— Richard Paul and Linda Elder, Critical Thinking Concepts and Tools, pgs. 8,9

# Critical Thinking Exercise

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1. How do you put a giraffe in your refrigerator?

*Open the refrigerator, put in the giraffe, and close the door.*

2. How do you put an elephant in your refrigerator?

*Open the refrigerator, take out the giraffe, put the elephant in and close the door.*

3. The Lion King is hosting a an animal conference. All the animals attend – except one. Which animal does not attend?

*The elephant. The elephant is in the refrigerator. You just put him in there.*

4. There is a river you must cross but it is used by crocodiles, and you do not have a boat. How do you manage it?

*You jump into the river and swim across. Have you not been listening? All the crocodiles are attending the animal conference.*

According to Anderson Consulting Worldwide, around 90% of the professionals tested got all questions wrong

# Critical Thinking Exercise 2

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Your daughter suffers from severe heart problems. She will need a pacemaker immediately. However, she also suffers from extreme Type I diabetes and she is a hemophiliac, so any operation poses an enormous risk. You have two alternatives:

- 1. A pacemaker that has a long history of success and is approved by the FDA. However, the battery lasts only 5 years which will require replacement of the entire unit.*
- 2. A pacemaker that has been recently invented but is still undergoing clinical trials. One of the advantages of this unit is that will never need to be replaced and will last for the lifetime of the patient.*

Which would you choose?

# Critical Thinking Exercise 3

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There has been a nuclear attack on your country. Because you had forewarning of the attack, you took the precaution of constructing a radiation repelling geodesic dome. You stocked it with enough oxygen, food, water, and medical supplies to sustain 10 people until the radiation levels drop so that it is safe to go outside. You intend to, with your other dome inhabitants, to then go outside and rebuild civilization. Including yourself, there are 9 people in the dome. One day you see a group of people approaching the dome. They plead with you to let them in. You have the capacity to admit one of them. Which one would be most useful to you and your group in your project to rebuild civilization?

1. A Farmer
2. A Radiation Sickness Specialist
3. A Teacher
4. A Pregnant Mother
5. A Hand-to-Hand Combat Trainer and Weapons Specialist

# Critical Thinking Mindset: Problem Solving

## Newell and Simon (1972)

**PROBLEM SPACE**

**Initial State:** Keith has to catch a 9 AM flight to Philadelphia and he is already behind schedule.

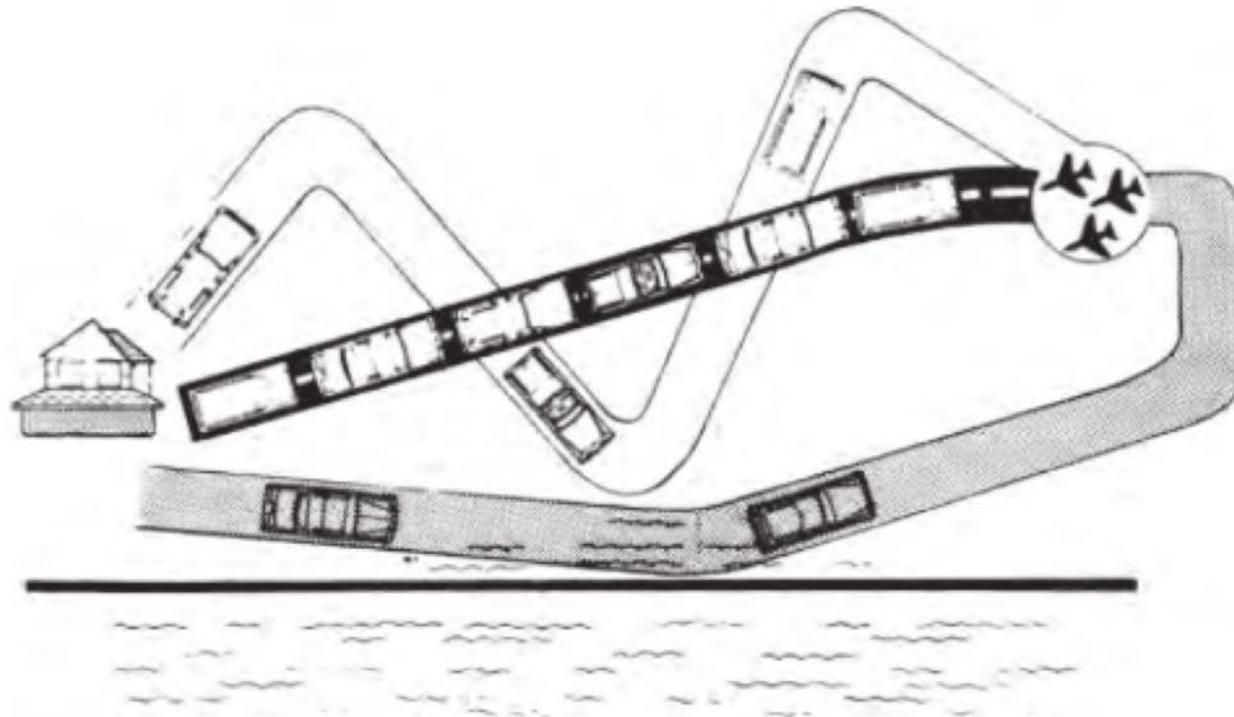
**Solution Paths:\***

1. Freeway - (*Givens*) quickest route. However, during rush hour traffic is usually heavy.
2. Back Road - (*Givens*) medium length. Usually light traffic. However, it is often closed due to river flooding and it rained last night.
3. In-Town Route – (*Givens*) longest route. Traffic usually light.

*\* If he spends too much time considering, he will miss his plane.*

**Goal State:** To reach the airport on time to catch flight to Philadelphia.

# Critical Thinking Mindset: Problem Solving



**Figure 9.2** The anatomy of the **airport problem**. Givens: **Keith** will drive to the **airport**. He will take one of these routes. He must take the fastest route.

# Critical Thinking Mindset: Problem Solving

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Well-Defined Problem: There are only the three alternate routes available to Keith.

Ill-Defined Problem: What if there are other solution paths?

- Subway
- Helicopter
- Other Airport
- Different Airline
- Go to Meeting

Even if a problem seems well-defined, it is useful to examine whether there are alternative approaches (Solution Paths). Perhaps the Goal State should be reconsidered. Is there a “no-win scenario”?

# Thank You!

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Please visit our web site for further information:

<http://www.clemson.edu/thinks2>

