

Welcome to this week's presentation and conversation
hosted by the
Canadian Association for the Club of Rome,
a Club dedicated to intelligent debate and action on global issues.



A Thinker's Guide to Surviving the Anthropocene: Essential Tools for our Cognitive Toolkits.

Our speaker today is Garth Mihalcheon, BSc, MBA, a musician, consultant, health care professional, and project manager. He has held management positions in healthcare and telecom. His thinking was kindled as an Emergency Department crisis counsellor, where he witnessed how the quality of people's thinking and judgement impacted the quality of their lives. As residents of the Anthropocene, we live in times of unprecedented novelty, ambiguity, and uncertainty. As never before, the quality of our lives depends upon the quality of our thinking, judgement, and problem-solving skills. Are our rules-of-thumb, formal guidelines, decision-making frameworks, expert tricks of the trade, and snippets of advice up to the challenge? How can we improve our reasoning in the face of our historic existential challenges? This talk centers on *how* we can think more critically about what can sabotage our best judgement and threaten the survival of countless future generations.

The presentation will be followed by a conversation, questions, and observations from the participants.

CACOR acknowledges that we all benefit from sharing the traditional territories of local Indigenous peoples (First Nations, Métis, and Inuit in Canada) and their descendants.



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for the Club of Rome](https://www.youtube.com/channel/UC...)

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#124



A Thinker's Guide to Surviving the Anthropocene: Essential Tools for Our Cognitive Toolkits

Garth Mihalcheon, BSc, MBA

“Making human brains safe for Gaia”

Structure of this talk



1. Introduction
2. Cognitive challenges of the Anthropocene
3. Overview of common thinking problems
 - **Thinking in 2 systems:** “Thinking, Fast and Slow” *
 - **Cognitive biases:** “systematic patterns of deviation from norms and/or rationality in judgment”
 - **Logical fallacies:** “reasoning that is logically invalid or that undermines the logical validity of an argument”
 - **Social influences:** sociocentric thinking, illusions, ethics

* Kahneman, Daniel (2011) *Thinking, Fast and Slow*

Structure of this talk continued

4. A critical thinking framework: cognitive tools for the Anthropocene

- Why teach critical thinking?
- Overview of a critical thinking teaching framework and tools

Thinkers' tips

- I will depict key tips and tools with a lightbulb



Purpose



- To appreciate the Anthropocene's extraordinary **cognitive challenges**
- To invite you to **think** about your own **thinking** to improve your **thinking**, using common reasoning **“tools”**
- To offer you some **cognitive tools** to stand up to bullies and say *“The Emperor has no argument!”*
- To inspire a life-long love of *“doing philosophy”* and *“scavenging for wisdom”**



* Weiner, Eric (2020) *The Socrates Express: In Search of Life Lessons from Dead Philosophers*

Framing an impossibly broad subject: how do we “think about thinking?”

Which academic discipline should “own” thinking?

- The cognitive neurosciences?
- Philosophy?
- Education?
- Neurology?
- Psychiatry?
- Sociology?
- Psychology?
- Cognitive psychophysiology?
- Artificial intelligence?
- Neurochemistry?
- Anthropology?
- Behavioural economics?

“I have no special talent. I am only passionately curious.”

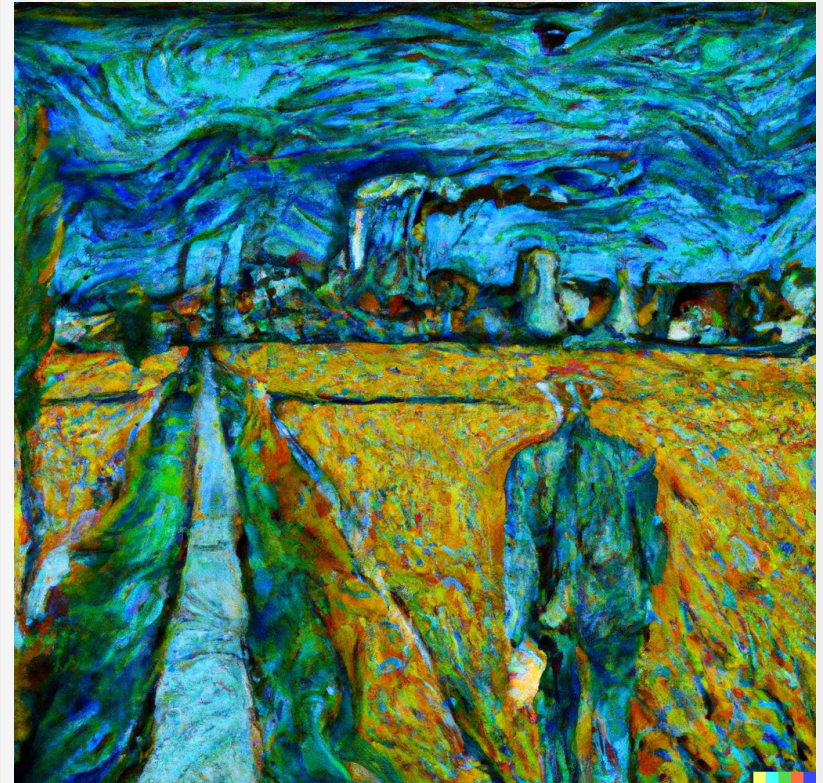
Albert Einstein

“Seedy bars and emergency departments are perfect habitats for watching human brains in action, unplugged and unfiltered.”

Anonymous

Department head: *“Stay in your lane. Who are you to tackle such an impossibly broad subject?”*

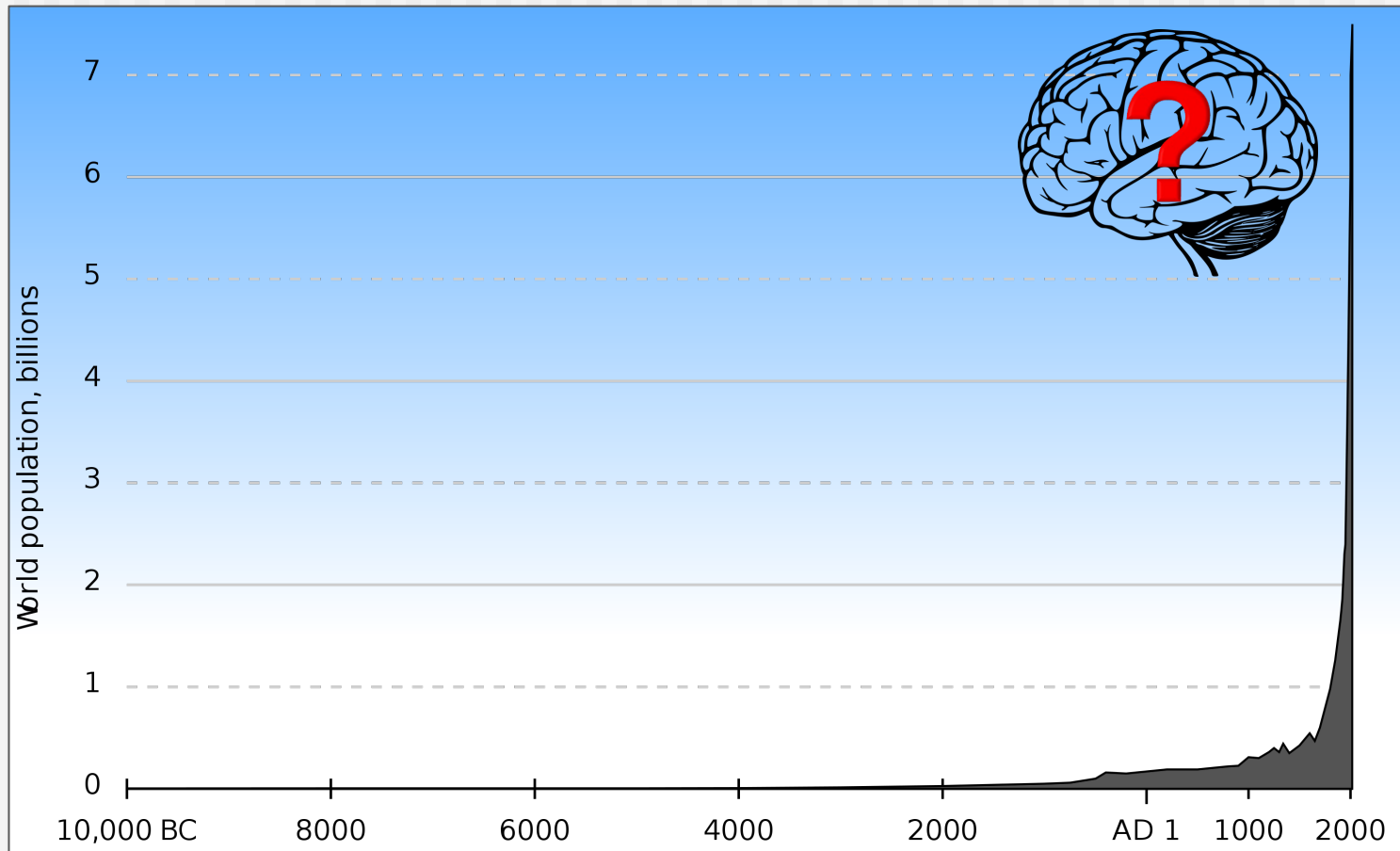
Me: *“I don’t know. Who am I?”* AI images generated by **DALL·E 2**



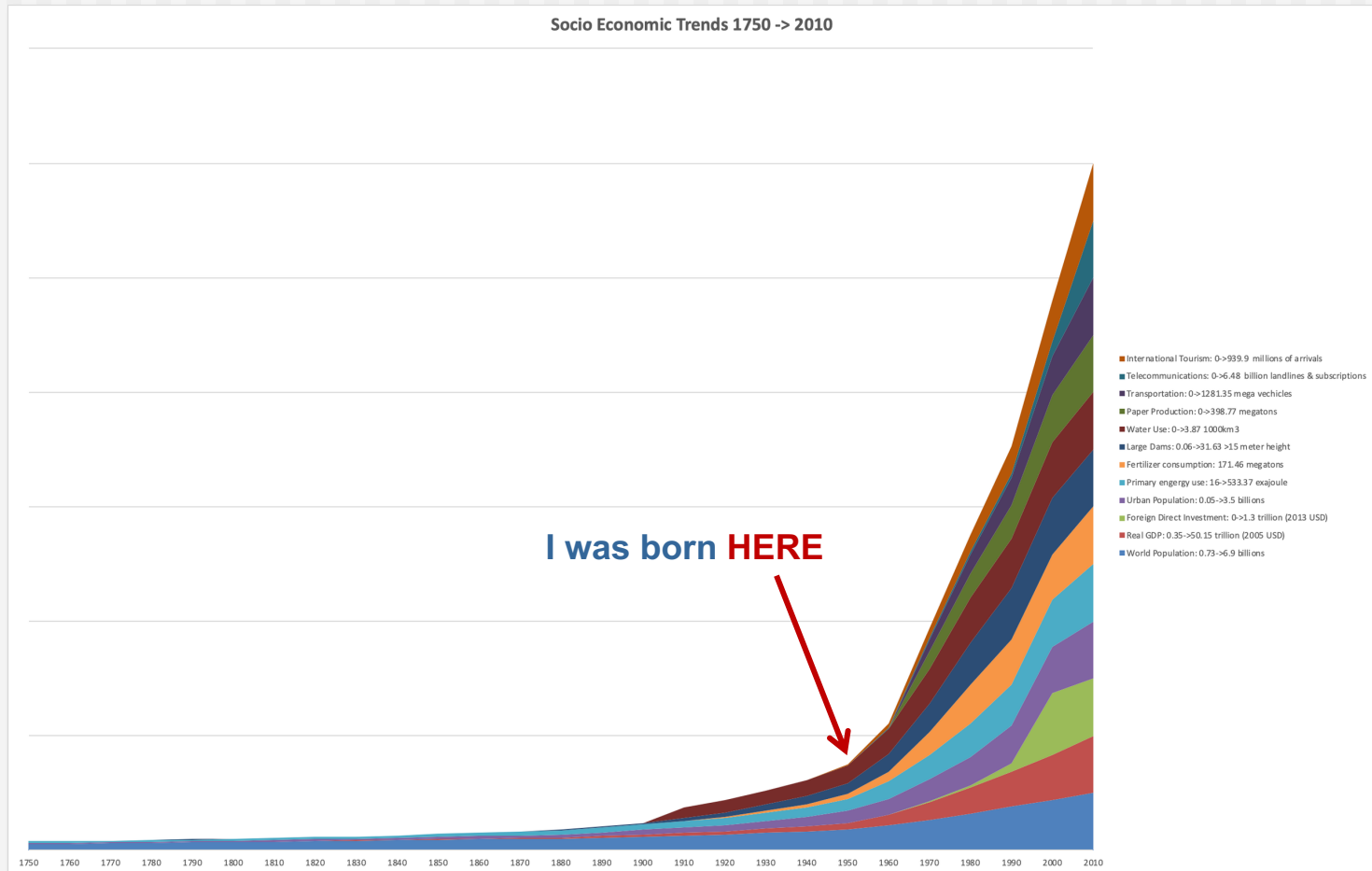
DALL·E 2: “Man searching for identify in a dystopian future in the style of van Gogh”
<https://openai.com/dall-e-2/>

Ways of thinking about another impossibly broad subject: the Anthropocene

How are we actually thinking about *this*?



Another perspective: the Great Acceleration in one lifetime



AI* perspectives of a utopian future



* DALL·E 2

<https://openai.com/dall-e-2/>

AI* perspectives of a dystopian future



* DALL·E 2

<https://openai.com/dall-e-2/>

Anthropocene perspectives: looking through straws



...vs. a lower resolution wide-angle view



If our brains are designed to simultaneously connect the dots *and* see the big picture

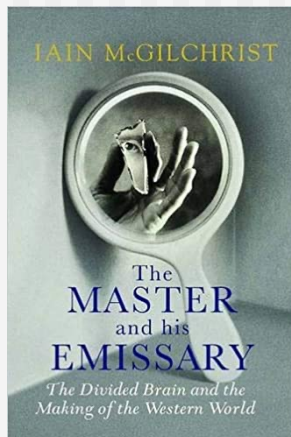


...are we biased in favor of apprehending the world through straws?

Dr. Iain McGilchrist

Why do animal brains have two different but complimentary hemispheres?

Has our amazing success with toolmaking, rules, procedures, technology, individualism and reductionist thinking caused us to favor the **left hemisphere** strengths of categorization and “re-presentation” (ie. “the whole **is** the sum of the parts”) to the detriment of **right hemisphere** strengths like metaphor, holistic perception of the world and the relationships between things (ie. “the whole is an emergent property of complex relationships among the parts”)?



McGilchrist, Iain (2009) *The Master and His Emissary: The Divided Brain and the Making of the Western World*

See the documentary “*The Divided Brain*” on CBC GEM:

<https://www.cbc.ca/documentarychannel/docs/the-divided-brain>

The ethical dilemma: how can we live a good life with Anthropocene Swords of Damocles dangling over our heads?



Definitions



Founding Assumption

The quality of our lives is contingent upon the quality of our reasoning

Critical thinking

- A cognitive toolkit for thinking about thinking (while thinking) to improve thinking

Tool

- A thing used to help perform a task and extend the capabilities of our bodies and minds

Judgement

- In a novel, risky and ambiguous world, *“Judgment can therefore be described as measurement in which the instrument is a human mind.”* *

* Daniel Kahneman, Olivier Sibony and Cass R. Sundstein (2021) *Noise, a Flaw in Human Judgement*

Definitions

continued

About thinking

- Perceiving the world, perceiving change, solving problems, making predictions of the future, planning, learning, feeling emotion, etc.
- Humans employ “cognitive prostheses” such as writing and mathematics
- For this talk the words ‘thinking,’ ‘reasoning’ and ‘cognition’ are interchangeable

Wisdom

- Your mental “database” of objective knowledge and experience hyperlinked to values, ethics, social and survival skills

Formal argument

- A conclusion supported by one or more valid premises
- A stated claim, assertion or opinion is not an argument



A formal argument for this talk

Premises (*Because*):

- The quality of our lives depends upon the quality of our thinking,
- The human brain is a complex evolutionary work-in-progress, prone to biases, faulty heuristics, errors, self-serving judgements, noise, perceptual and cognitive illusions,
- Accomplished thinking in one domain of expertise does not necessarily transfer to other domains, and
- Our present geological epoch, termed the Anthropocene, is a true outlier in human evolution characterized by extremes of novelty, ambiguity and uncertainty,

Conclusion (*Therefore*):

- We must improve our thinking skills commensurate with the unique challenges of the Anthropocene.

Cognitive challenges of the Athropocene



Our brains

*“To begin with, your mind is infatuated with itself. In addition to being utterly brilliant, it is: **

- Unscrupulous
- Vain
- Emotional
- Immoral
- Deluded
- Pigheaded
- Secretive
- Weak-willed
- Bigoted
- Vulnerable

😊 Experimental psychology should invoke humility...

* Fine, Cordelia (2006) *A Mind of its Own*

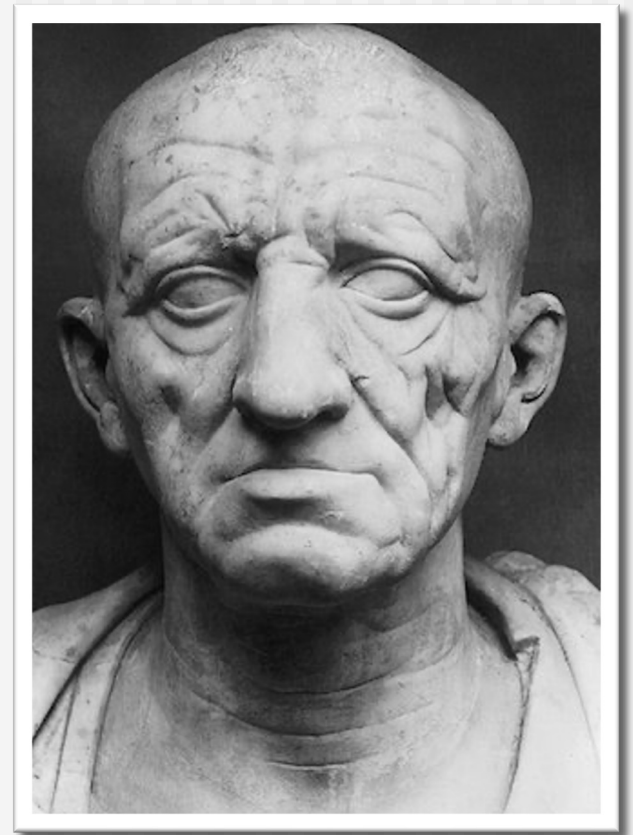
~~What~~ *How* was I thinking?

Where did his *train of thought* jump the tracks?



Philosophy for the lazy thinker

“Meh, good enough”



Mediocrates

Optical illusions, cognitive illusions

If our perception can be fooled,



why not our thinking?

The greatest cognitive illusion of the Anthropocene

😁 Using the energy of fossil fuels, continuous economic growth is both *feasible and desirable*



Cognitive challenges of the Athropocene

continued



(Pre) Frontal Assault *










- 😊 “It’s natural to think that we have it all figured out. We believe that we no longer suffer under the misguided notions, superstitions, and prejudices that misled our predecessors. “How could they have believed such things?” we wonder, and congratulate ourselves that we know better.
- 😬 “While it’s easy to fall victim to this cultural delusion, surely there are many things we fail to see today, blind spots that will astound our descendants. In a hundred years or so, will they look back and wonder, “How could they have thought that?”
- 😬 The [Pre-Frontal Cortex] has an amazing range of abilities, but also has two major liabilities. One is that it does not work well, if at all, under stress. Second is that, once stressed, any vulnerabilities to mental illness may then become active. It is just this process of stressing the PFC by the relentless demands of modern life that places so many people either at risk for mental illness or actively suffering from a particular disorder.”

* Rego, Mark D. (2021) *Frontal Fatigue: The Impact of Modern Life and Technology on Mental Illness*

Cognitive challenges of the Anthropocene

continued

Anthropocene cognitive stressors

-  Accelerating **change** across multiple societal systems and dimensions
-  Rapidly changing **demographics** in a highly mobile world
-  Increasing **separation** from the natural world
-  Having to think about the **unimaginable** – climate catastrophe, ecosystem collapse, decline of liberal democracies, rise of autocracies, collapsing human systems (Health), technological risks (AI), extreme social inequality
-  Generations who believe they don't have a viable future – “**Generation Dread**” *
-  The “**theft of attention**” – involuntary exposure to an endless parade of images, messages and symbols
-  Sophisticated media **manipulation** of emotions, perceptions and beliefs
-  Unprecedented **reach** of digital technologies and the surveillance state
-  Normalization of **lying and fantasy**

* Wray, Brit (2022) *Generation Dread: Finding Purpose in an Age of Climate Crisis*

Overview of common thinking challenges



“Nature cannot be fooled







but

You are the easiest person to fool”









Nobel Laureate Richard Feynman

Problems thinking about the climate crisis

-  Psychological defense mechanisms: denial, avoidance, suppression
-  Misapplying the concept of “reasonable doubt”
-  “Shifting / Creeping baseline syndrome:” when comparing the present with some time in past, we don’t notice that our baseline of comparison has moved forward in time
-  False equivalency between evidence-based arguments and intuition-based claims
-  Complex social/tribal/economic affiliations on the scale of 8 billion people
-  “Short-termism:” planning that favours the short-term gains of current stakeholders over the long-term needs of future generations*

* MacAskill, William (2022) *What We Owe the Future*

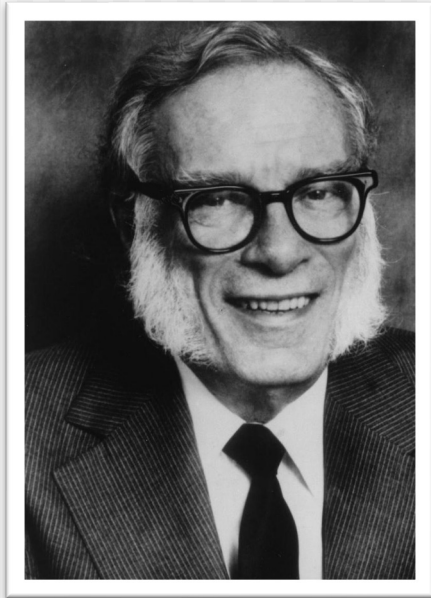
Problems thinking about the climate crisis

-  Declining civility, “ad hominem” arguments
-  “Whataboutism”
-  Egocentric and Sociocentric thinking
-  The embrace of subjective reality – “my opinion is as true as your facts”
-  Failure of **imagination**: we cannot conceive of what climate crisis will look like in short-to medium future because we tend to base our thinking about the future on the present*
-  “The death of expertise” **

* Gilbert, Dan (2006) *Stumbling on Happiness*

** Nichols, Tom (2017) *The Death of Expertise: The Campaign Against Established Knowledge and Why it Matters*

A “cult of ignorance?”



“There is a cult of ignorance in the United States, and there has always been. The strain of anti-intellectualism has been a constant thread winding its way through our political and cultural life, nurtured by the false notion that democracy means that ‘my ignorance is just as good as your knowledge.’”

Isaac Asimov (January 1980) Newsweek Magazine

“Whom the gods would destroy they first make mad”

From ancient Greece

Common thinking problems in two systems: *Thinking, Fast and Slow* *



Intuition

- Fast
- (Apparently) effortless
- Automatic
- Hidden
- Easy to fool
- Expert intuition is essential, non-expert intuition can be disastrous
- Industrious



Reason

- Slow
- Hard work
- Deliberate
- Explicit
- More difficult to fool
- Expert reasoning more likely produces better long-term decisions
- Lazy

* Kahneman, Daniel (2007) *Thinking, Fast and Slow*

Note: when contemplating brain function, think “**networks**,” not “modules”

Intuitive thinking

continued

- Intuition works **unconsciously in the background** without our being aware of the individual steps we take to make a decision
- Intuitive thinking does **not** mean using ESP or tapping into “The Force”
- Expert intuition must be **trained, practiced and evaluated**



Intuitive decision-making

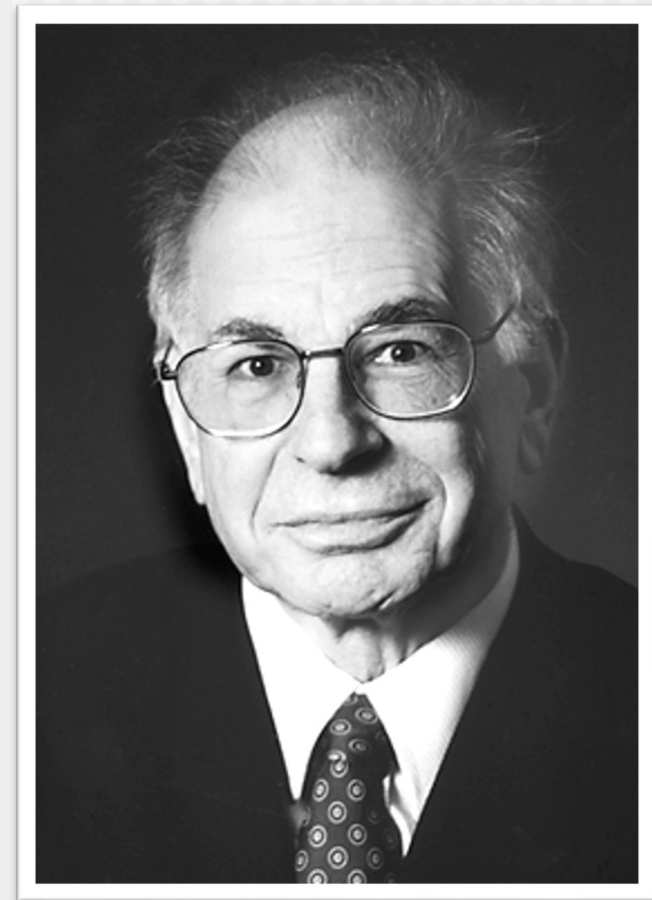
- Expert intuition can lead to **faster and better decisions** than formal reasoning but formal reasoning is **slower, effortful but more explicit**
- Research shows that intuition uses **heuristics** (i.e. informal rules of thumb) that are part of our “mental circuitry” but these are often **hidden and implicit**
- Intuition offers **cognitive “short cuts”** that provide clear evolutionary benefits for our species (fight or flight) but,
- The Anthropocene demands **difficult, effortful, explicit reasoning** that is always open to disconfirmation: eg. **Science**

Cognitive biases: how intuition misleads



- Biases are “systematic errors of intuition”
- Nobel laureate Daniel Kahneman and others have demonstrated experimentally that intuitive thinking is a black box: brains have intractable biases that are difficult to perceive and overcome

I like to call our Anthropocene brain
“Pandora’s Black Box”



When intuition betrays us: cognitive biases



- **Confirmation bias:** we tend to pay more attention to information that supports our beliefs while ignoring or downplaying disconfirming evidence
- **Ease of recall bias:** the more we can remember an event, the greater its presumed frequency
- **Insensitivity to sample size:** we fail to appreciate that small sample sizes may be misleading
- **Hindsight bias:** once we know how things turned out, we tend to overestimate how likely we would have predicted the outcome
- **Overconfidence:** we tend to be overconfident with respect to our own judgment and abilities as compared with others
- **Groupthink:** our judgment is skewed by strong identification with in-group status, perceptions and culture

Cognitive biases

continued



- **Framing effects:** the context in which information is presented can skew our judgments
- **Unrealistic optimism:** we tend to believe our futures will be rosier than others'
- **Misconceptions of chance:** e.g. gamblers fallacy – “I’m on a roll!”
- **“Bias bias:”** “I am less biased than others”
- **Misconceptions of chance:** e.g. gamblers fallacy – “I’m on a roll!”
- **Implicit bias (stereotyping):** tendency to attribute positive or negative qualities to a group of individuals
- **The Dunning–Kruger effect:** people with low ability, expertise, or experience regarding a certain type of task or area of knowledge tend to overestimate their ability or knowledge (high performers may experience the opposite tendency to underestimate their skills)

When Reason goes *bad*: logical fallacies



A logical fallacy is reasoning that is logically invalid, or that undermines the logical validity of an argument.

- **Straw man:** disputing an argument by exaggerating it, misrepresenting or otherwise distorting it – *“By opposing unlimited wiretaps Mr. Blahblah is obviously arguing in favor of terrorism”*
- **Misplacing the burden of proof:** the person making the claim does not defend it but insists that his questioner disprove it – *“Prove that I’m NOT psychic”*
- **Circular reasoning** or **begging the question:** the conclusion is a restatement of one of the premises – *“Abortion is wrong – abortion is murder”*
- **Argument from ignorance:** (*ad ignorantiam*) if I can’t explain it, it mustn't be true – *“I cannot imagine how this beautiful world could come into being without God’s design”*

Logical fallacies

continued

- **Attacking the person:** (*ad hominem*) disputing a position or argument by discrediting its source – “*You agree with global warming but you drive a BMW – hypocrite!*”
- **Red herring:** the question asked was not the question answered (Q. “*Are the tar sands safe for the environment?*” A. “*But you **need** the oil! You drive a car!*”
- **False dilemma:** only two choices are given when in fact there are more – “*You’re either for me or against me*”
- **Scare tactic:** using fear, rather than evidence, to support a claim – “*How can you be against the death penalty with all these pedophiles running around our neighborhoods?*”
- **Hasty conclusion:** over-generalizing – the size of the sample is too small to support the conclusion – “*That surgeon was rude to me – all surgeons are jerks*”

Logical fallacies

continued

- **Appeal to authority:** (*ad verecundiam*) it must be true if some authority figure says so – “4 out of 5 doctors recommend Bluxo toothpaste”
- **Appeal to popularity:** (*ad populum*) it must be true because everybody believes it – “Everybody knows that masks don’t work!”
- **Slippery slope:** (*reductio ad absurdum*) discrediting an argument by carrying it to an absurd conclusion – “If we allow gay marriage eventually we’ll be marrying our pets”
- **Appeal to motive:** challenging an argument by calling into question the motives of its proponent – “You’re just saying that because _____”

Social and situational dynamics



Judgment and behavior are strongly influenced by **social and situational cues**. Examples: the Stanford Prisoner Experiment,* Abu Ghraib prison

Ask yourself:

Would you have worked for the Nazis in implementing the “final solution?” Would your neighbor have turned you in to the Gestapo?

* Zimbardo, Philip (2007) *The Lucifer Effect: Understanding How Good People Turn Evil*

Social and situational dynamics

Ask yourself:

Why do we often choose mentally unwell leaders?

How do we justify such a decision?

What *collective illusions* would inform our thinking? *

* Rose, Todd (2022) *Collective Illusions: Conformity, Complicity and the Science of Why We Make Bad Decisions*

Nasty social and situational dynamics that affect cognition

- Deindividuation of out groups
- Dehumanization of out groups
- Anonymity, crimes of omission
- Systemic propaganda, ideology, dogma
- Fear of rejection by one's peer group
- Role sanction by authority figures
- "The Lucifer Effect" and "creative evil"



Social and situational dynamics

Is evil caused by “bad apples” or “bad barrels?”

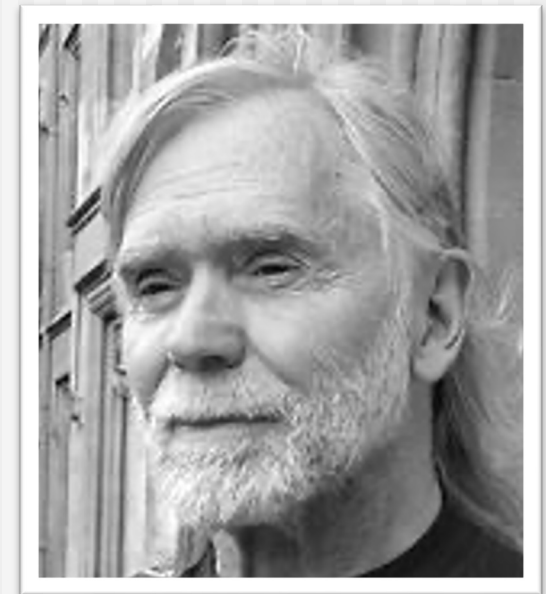


Lynndie England following orders, Abu Ghraib prison, Iraq, 2003

Overview of Critical Thinking



“Critical thinking is the awakening of the intellect to the study of itself.”



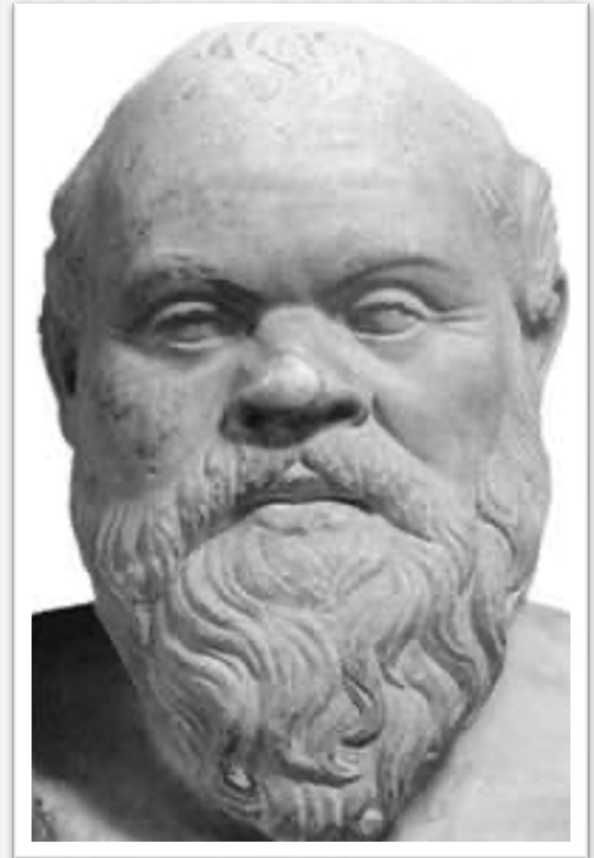
Dr. Richard Paul

Doing philosophy – the best kept secret for 2400 years

“The unexamined life is not worth living.”



From Plato's *Apology* (38a5–6)



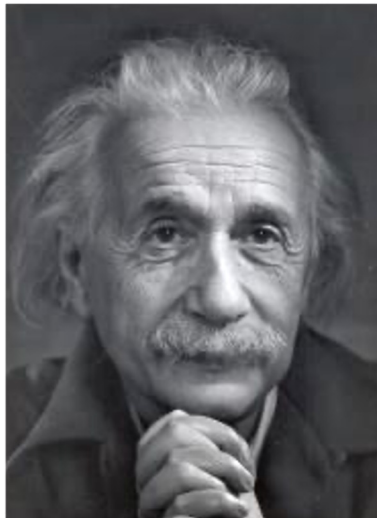
Socrates

More thinking about thinking



*“The essence of the independent mind lies not in **what** it thinks, but in **how** it thinks.”*

Christopher Hitchens (2009) *Letters to a Young Contrarian*



“The world we have created is a product of our thinking; it cannot be changed without changing our thinking.”

Albert Einstein

Misgivings about teaching critical thinking

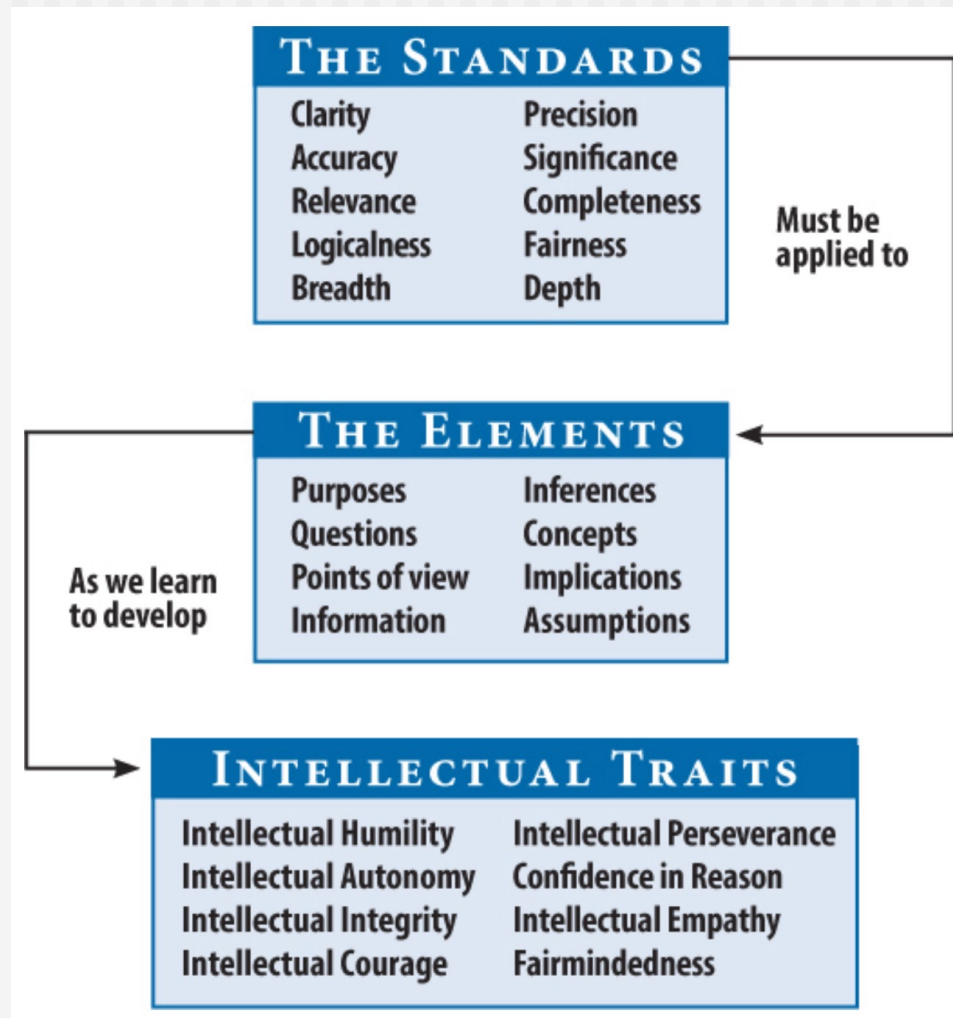
- “Aren’t some things just a mystery? Won’t we lose our sense of wonder about the world if we think too much? Will we “unweave the rainbow?”
- “Aren’t we *entitled to our own opinions?*” [Actually, no!] *
- “Aren’t people free to believe what they want? Who are you to judge?”
- “Our children might question their faith!”
- “Our students are already critical thinkers because we have science classes.”
- “Overthinking is bad for kids’ self-esteem.”

* Whyte, Jamie (2004) *Crimes Against Logic: Exposing the Bogus Arguments of Politicians, Priests, Journalists, and Other Serial Offenders*

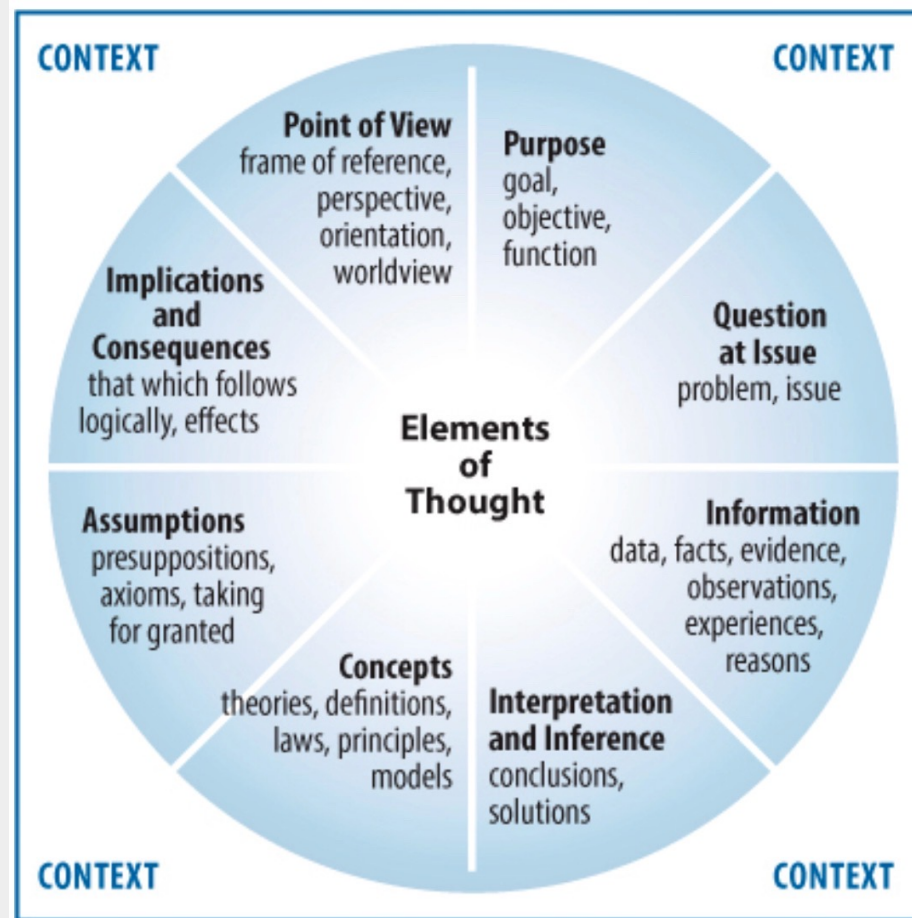


The Foundation for Critical Thinking: a Critical Thinking framework for all students

<https://www.criticalthinking.org>



Analyzing the Elements of Thought



Adapted from Drs. Richard Paul & Linda Elder, Foundation for Critical Thinking

Applying Universal Intellectual Standards to the elements of thought

Clarity

Understandable, the meaning can be grasped

Could you elaborate further? Could you give me an example? Could you illustrate what you mean?

Accuracy

Free from errors or distortions, true

How could we check on that? How could we find out if that is true? How could we verify or test that?

Precision

Exact to the necessary level of detail

Could you be more specific? Could you give me more details? Could you be more exact?

Relevance

Relating to the matter at hand

How does that relate to the problem? How does that bear on the question? How does that help us with the issue?

Depth

Containing complexities and multiple interrelationships

What factors make this a difficult problem? What are some of the complexities of this question? What are some of the difficulties we need to deal with?



Universal Intellectual Standards

Breadth

Encompassing multiple viewpoints

Do we need to look at this from another perspective? Do we need to consider another point of view? Do we need to look at this in other ways?

Logic

The parts make sense together, no contradictions

Does all this make sense together? Does your first paragraph fit in with your last? Does what you say follow from the evidence?

Significance

Focusing on the important, not trivial

Is this the most important problem to consider? Is this the central idea to focus on? Which of these facts are most important?

Fairness

Justifiable, not self-serving or one-sided

Do I have any vested interest in this issue? Am I sympathetically representing the viewpoints of others?

Excerpted from "The Thinker's Guide to Analytic Thinking", page 6-7.



Cultivating essential intellectual traits



Intellectual Humility	vs	Intellectual Arrogance
Intellectual Courage	vs	Intellectual Cowardice
Intellectual Empathy	vs	Intellectual Narrow-mindedness
Intellectual Autonomy	vs	Intellectual Conformity
Intellectual Integrity	vs	Intellectual Hypocrisy
Intellectual Perseverance	vs	Intellectual Laziness
Confidence in Reason	vs	Distrust of Reason and Evidence
Fair-mindedness	vs	Intellectual Unfairness

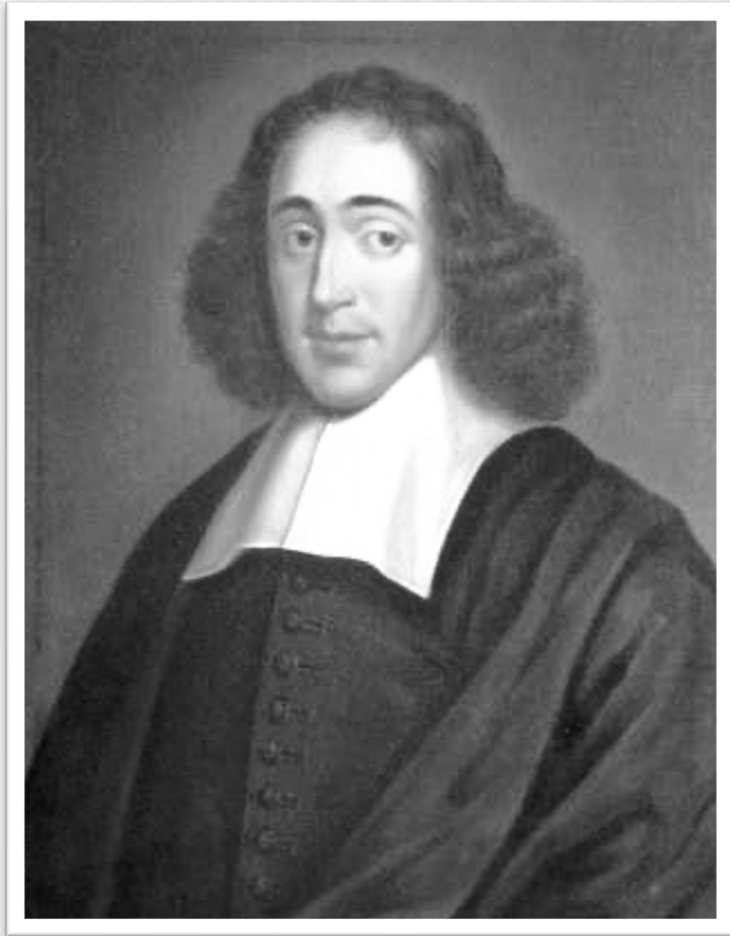
Gift-wrapping essential intellectual traits in *skepticism*



An intellectual stance towards claims that:

- Takes a **provisional** approach to all claims
- Demands **compelling evidence** before a claim is accepted
- Does not defer to **dogma**
- Is embodied in the **scientific method**
- Is **NOT** about being a cynical old debunker (see Spinoza)

Spinoza's dictum



“I have made a ceaseless effort not to ridicule, not to bewail, not to scorn human actions, but to understand them.”



Prerequisites: asking good questions

- The quality of our lives is determined by the quality of our thinking.
- The quality of our thinking is informed by the quality of our questions.
- Without essential questions, we often fail to focus on the significant and substantive.
- Use the Critical Thinking framework to practice asking the right questions.

Wrong approach



Good thinking tips

#1

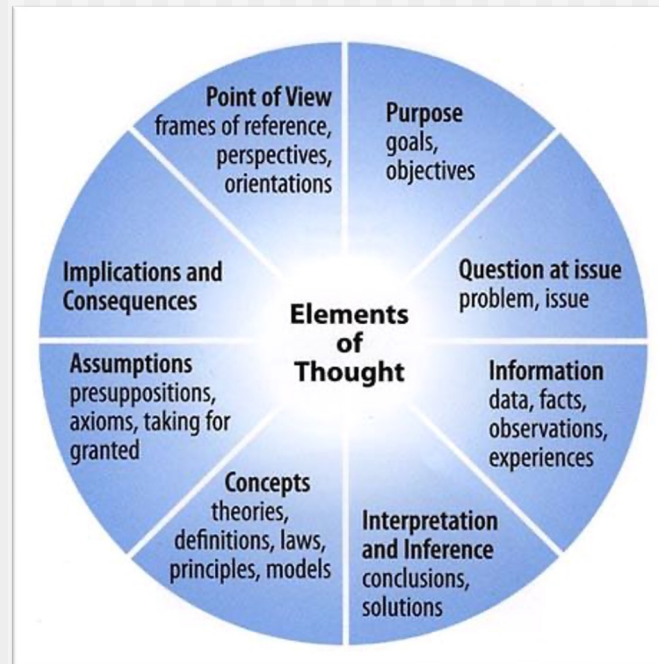


- Practice paying **close attention** to your own thinking
- Be on the lookout for common biases such as confirmation bias and your own prejudices, **be skeptical** of “gut instincts”
- When reading about climate change, practice **skepticism as discussed: know your subject and always question sources and their arguments using critical thinking tools.**
- Ensure the **burden of proof** rests with the person making the claim
- **Exercise:**
 - 🧠 Take any Op Ed
 - 🧠 Number and underline stated **Conclusions** in one color
 - 🧠 Underline associated **Premises** in another color, using the number of the conclusion they support
 - 🧠 Think about how the premises support their respective conclusions by using the Critical Thinking framework, then look at the overall logic of the piece. Does it make sense?

Good thinking tips

#2

- Understand the real question or issue at hand by **internalizing** the Elements of Thought diagram
- **Exercise:** Practice the elements of thought with a variety of claims and opinions:



Good thinking tips

#3

- Always apply **Universal Intellectual Standards**
 - Clarity
 - Accuracy
 - Precision
 - Relevance
 - Depth
 - Breadth
 - Logic
 - Fairness
- Save time by applying **Hitchen's Razor**:
"What can be asserted without evidence can be dismissed without evidence."
- Always be particularly **wary** of social media as a news source: **triangulate, verify and repeat**



Good thinking tips

#4

- Never settle for **anecdotal evidence**
- Always make explicit a **valid baseline**
- Make it a habit to cultivate **essential intellectual traits** whenever exercising judgement:
 - **Intellectual Humility** (vs Intellectual Arrogance)
 - **Intellectual Courage** (vs Intellectual Cowardice)
 - **Intellectual Autonomy** (vs Intellectual Conformity)
 - **Intellectual Empathy** (vs Intellectual Narrow-Mindedness)
 - **Intellectual Integrity** (vs Intellectual Hypocrisy)
- **Identify individuals** who exemplify essential intellectual traits and learn from their thinking and their arguments

A portrait of intellectual integrity



“Hungry children dreaming of a beautiful future”





Reason is our candle in the darkness

Please nourish its precious flame

(Thank you Carl Sagan)

Discussion



The end

