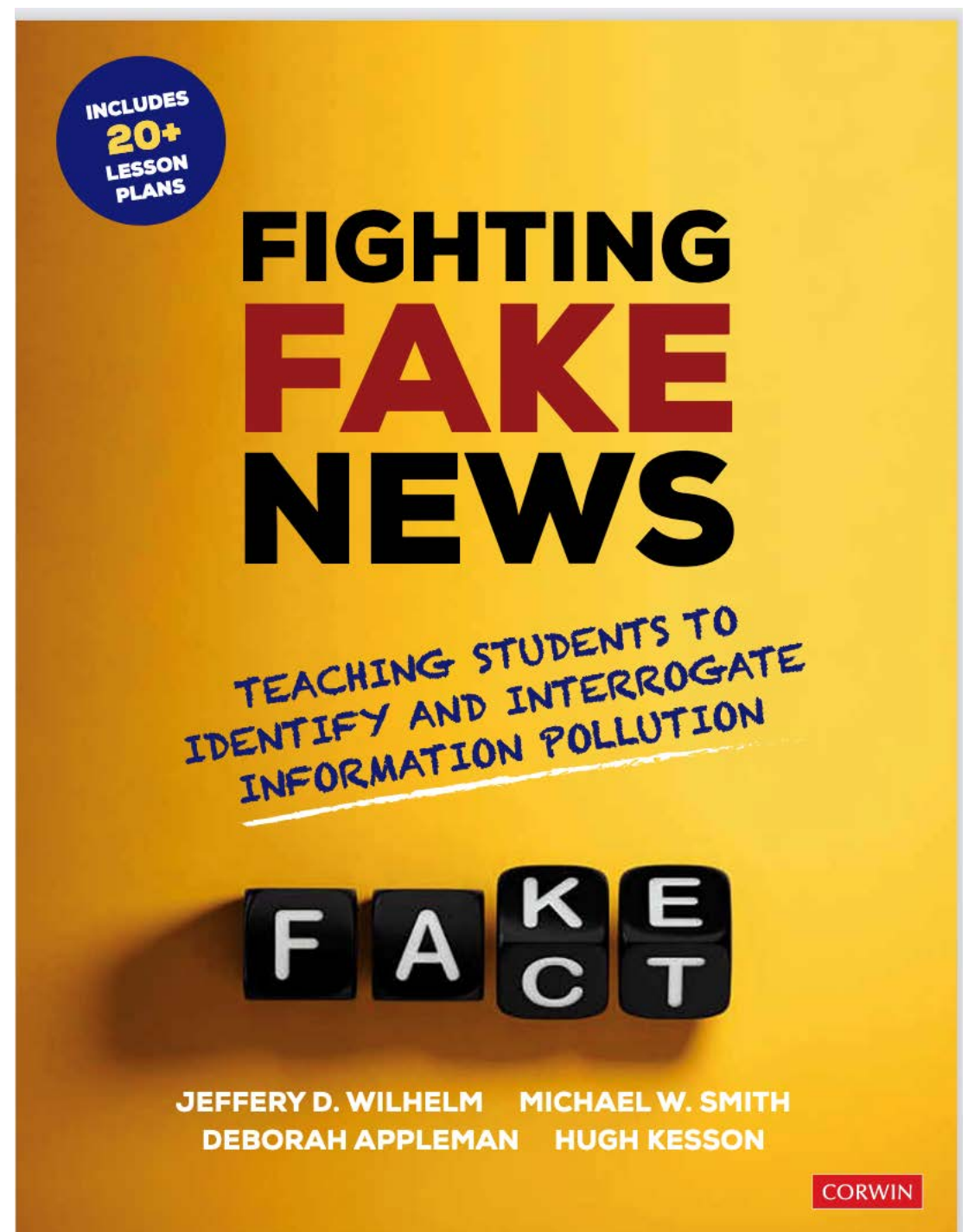# Knowing Your Own Mind: Why We Are All Susceptible to Information Pollution and What We Can Do About It

Jeffrey D. Wilhelm

Boise State University

@ReadDRjwilhelm

Essential Question:

How are teens (and the rest of us) **susceptible to and affected by** information pollution, especially on social media – and what can we do about it?
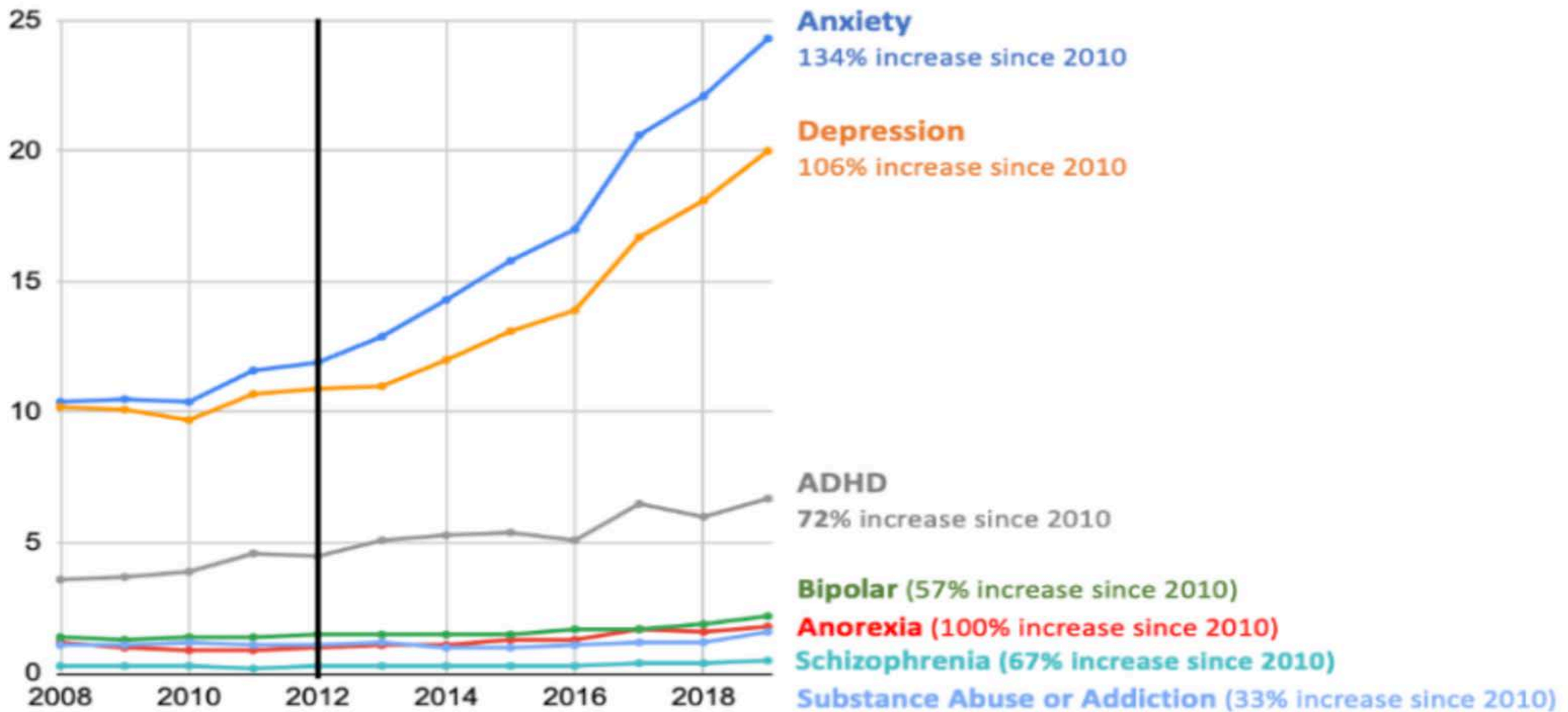
Learning Targets for today:

Participants will...

1. Understand more about the mental health challenges facing today's teens, and how their mental health is affected by information pollution in general, and how it is promoted by social media use (SMU) in specific

2. Understand why all of us are so susceptible to .information pollution

    3. Develop ideas about how to control for the cognitive biases that make us most susceptible to information pollution.

What's the problem? Teen Mental Health

% of U.S. Undergraduates Diagnosed with a Mental Illness

Anxiety
134% increase since 2010

Depression
106% increase since 2010

ADHD
72% increase since 2010

Bipolar (57% increase since 2010)
Anorexia (100% increase since 2010)
Schizophrenia (67% increase since 2010)
Substance Abuse or Addiction (33% increase since 2010)

SOURCE: American College Health Association (ACHA-NCHA II)

Other studies on youth

2023 CDC Youth Risk Behavior Study: 60% of HS girls suffer persistent sadness and hopelessness; nearly 25% have made suicide plan; girls more at risk then boys; teens with a liberal point of view are more at risk (*Politics of Depression, 2023*)

Covid had a minimal effect

Other studies on youth

Erik Erikson: early to late adolescence is when we stake our identity through our evolving interests, competence, and group affiliation

Now this fashioning of self, and the granting of it, is done largely online, as is finding a place to belong.

All of us package a self for public consumption; this cuts into offline socialization; popularity and identity granting is quantified

Corporations are exploiting children and information about them through triggering content and targeted ads, etc. (*Social Dilemma*)

-Let's acknowledge misogyny, sexual violence, political dysfunction, existential dread, but studies show these are not the most explanatory factors

What's the primary cause of the problem? SMU

- Jonathan Haidt, *Kids in Space*; Jean Twenge *iGen*
- *55 studies vs. 11 find a significant correlation between SMU and anxiety, depression and poor mental health*
- 2012 mental health starts going south
- 2012 Facebook buys Instagram
- 2012 selfie enters common parlance
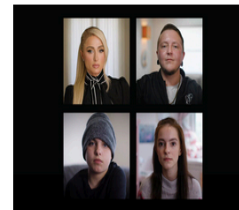- From 2009-14: just over 50% of 8th graders report nearly daily SMU to over 80%

More on teenage mental health

Opinion | Ross Douthat
American Teens Are Really Miserable. Why?
Feb. 18, 2023
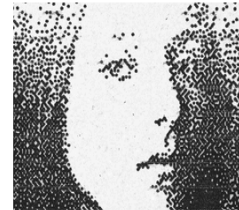
Opinion | Jamieson Webster
Teenagers Are Telling Us That Something Is Wrong With America
Oct. 11, 2022

Opinion
Can You Punish a Child's Mental Health Problems Away?

Social Media (SMU) as a source of information pollution, designed to propagate info pollution

- Neil Postman's *Amusing Ourselves to Death* (1985): we have begun a "vast descent into triviality" and "we will lose the distinction that informs all others – of fact versus fiction."

- Sherry Turkle's *Second Self* (1984): online environments allow us to create alternate selves and "alternate fact-based" realities

Social Media (SMU) as a source of information pollution, designed to propagate info pollution

- Megan Garber in the March 2023 issue of *The Atlantic*: "Instagram users . . . post their own touched up, filtered story for others to consume . . . Even the less photogenic Twitter invites users to enter an alternate realm."

- Basically: Online, everyone is lying, or at least mis-representing – it's information pollution, people!

"Today, are you going to get better or are you going to get worse?"
– Coach "One Arm" Willie Stewart

We CAN get better, and we CAN help young people get better at critical reading and controlling for fake news; we can help them have a more accurate world view and achieve better mental health *but only if we pay mindful attention over time . . .*
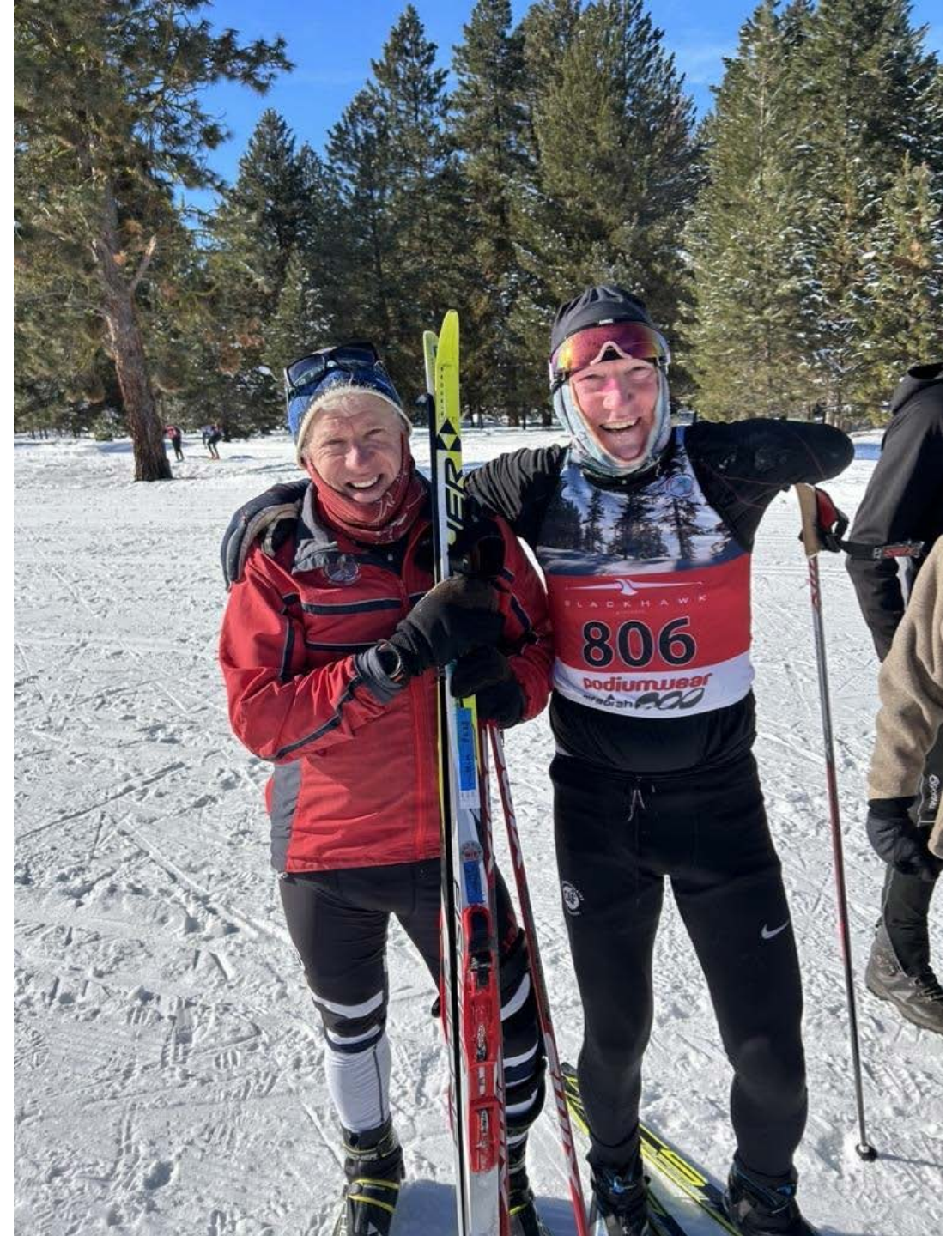
SUCCESS

SUCCESS

WHAT PEOPLE THINK
IT LOOKS LIKE

WHAT IT REALLY
LOOKS LIKE

WWW.ATBREAK.COM

Teens who trust online information find it less stressful

By [James Dean, Cornell Chronicle](#)

April 5, 2023

Teens' trust in the news they consume on social media – or lack of it – may be key to whether it supports or detracts from their well-being, according to Cornell-led psychology research.

Surveying nearly 170 adolescents and young adults from the U.S. and U.K. early in the pandemic, the researchers found that those more trusting of the COVID-19 information they saw on Facebook, Twitter and TikTok were more likely to feel it was empowering, while those less trusting were more likely to find it stressful.

The findings highlight the need for news literacy programs to help young people discern fact-based, trustworthy sources from misinformation and conspiracy theories, and support a more nuanced understanding of how social media use impacts well-being and mental health.

What's the way forward?

"A fact-based worldview is more useful for navigating life, just like an accurate GPS is more useful for finding your way in the city."

- Hans Rosling, *Factfulness*, p. 255

But HOW?

Types of Information Pollution: Naming and Knowing

Reader Errors
- Motivated misunderstanding
- Fake skepticism
- Reader misunderstands due to lack of knowledge (e.g., insufficient background or insufficient reading strategies or genre knowledge; a satire, parody, irony misconstrued)
- Cognitive bias misleads us

<please equalize spacing between edge of boxes and bullets across all three boxes> x 3

Misinformation
- Inaccurate, misleading, incorrect, false information that is accepted, disseminated, or forwarded regardless of intent to deceive (e.g., many ads, testimonials, infotainment, soft news)

Deliberatively Manipulative Content and Action
- Malinformation: genuine ~~info~~ with intent to cause harm (e.g., false connections, misleading context, misleading framing, false context)
- Exaggeration, commentary/opinion masquerading as news, manipulative/poor reasoning from data, imposter content, manipulated content, fabricated content, disinformation, propaganda

Factful Information, Credible/Authoritative, No Desire to Deceive

Entirely Made Up, Manipulative, Consciously Designed, and Used to Deceive

News literacy in practice

The News Literacy Project uses five primary standards to define the core competencies students need to be news-literate.

- **Standard 1:** Students distinguish news from other types of information and can recognize both traditional and nontraditional ads.

- **Standard 2:** Students acknowledge the importance of the First Amendment in American democracy and a free press to an informed public.

- **Standard 3:** Students understand the standards of quality journalism and can use them to identify credible information and sources.

- **Standard 4:** Students demonstrate increased critical habits of mind, including effective verification skills and the ability to detect misinformation and faulty evidence.

- **Standard 5**: Students express a sense of responsibility for the information they share and feel more empowered to be civically engaged.
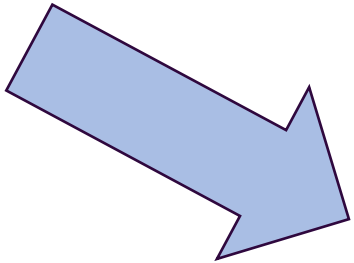
We need News Literacy, including ways to identify and control for information pollution

DRAFT Overview Grade Band Expectations – a **working** document as of 4/11/23

	PreK-2	3-5	6-8	9-12+
S1: Students distinguish news from other text types/genres as ways of purveying information and information pollution, and how different text types are constructed for different purposes, with different levels of information quality, for different meanings and effects.	Develop foundational knowledge of what news is and recognize that it is meant to inform you. Differentiate between news, entertainment and opinion. Begin using these vocabulary words in conversations.	Understand the primary purpose of news (information), opinion, entertainment and ads. Deepen knowledge of news versus opinion through fact-based (checkable) statements and opinion-based statements. Distinguish straight news from opinion journalism and identify different types of ads in print, broadcast and other mediums.	Zone information according to primary purpose: news, opinion, entertainment, advertising, raw information, propaganda. Explore the distinction between fact, opinion, and various kinds of information pollution such as disinformation and propaganda. Deepen knowledge of branded content. Students can recognize both traditional and non-traditional ads.	Deepen understanding of information zones. Investigate power structure and ownership of news organizations. Classify propaganda on a continuum of information pollution. Describe factors influencing marketing and analyze how sources monetize information. Identify how a medium and intended audience can influence and affect purpose, meaning and effect (e.g. video, Tweet, article, etc).
	Throughlines: Different text types/genres make different uses of types of information and information pollution for unique purposes, meanings and effects			

We need News Literacy, including ways to identify and control for information pollution

S4: Students demonstrate increased critical habits of mind, including effective verification skills and the ability to detect misinformation and faulty evidence.	In age-appropriate ways, recognize rumors and misinformation. Gather facts before coming to a decision.	Define misinformation. Understand the ways texts use other texts. Determine the overall strength of an argument. Rate evidence on a continuum, identifying different elements/criteria as justification of strong evidence.	Recognize, define and differentiate different types of misinformation: Satire, False context, Imposter content, Fabricated content and Manipulated content Explain how algorithms use data to personalize information for individuals. Utilize disciplinary knowledge of how information is created and its different purposes to analyze and critique texts. To verify information, use news literacy skills such as lateral reading, multiple sources, critical discourse analysis, web archives and reverse image search. Differentiate between claims supported by actual evidence and sound reasoning and those which rely on faulty or inauthentic "evidence" and logical fallacies: ad hominem, false dilemma, false equivalence, slippery slope, straw man. Explain how algorithms use data to personalize information for individuals.	Deepen understanding of misinformation types, logical fallacies and algorithms. Differentiate news mis/disinformation from the use of logical fallacies in an argument or opinion piece. Differentiate between credible and questionable sources of data. Explain why understanding and debunking misinformation matters. Identify websites, apps, and social media platforms that use personalization algorithms. Recognize how personalization can reinforce personal biases and how algorithms can lead to encountering mis/disinformation. Explain what "conspiracy theories" are and why people find them appealing and compelling.
Throughlines: Quality journalism (like any community of practice) is dedicated to rigorous standards of accuracy and the constitution of verifiable knowledge. No source or representation of knowledge is perfect, but there are critical standards for the production, representation and sharing of information that must be respected.				

We need News Literacy, including ways to identify and control for information pollution

S5: Students express a sense of responsibility for believing, producing, confirming, justifying and sharing credible information,. ...and use these skills to participate effectively in various communities and democratic life.	Develop notions of community-building. Be responsible with information in age-appropriate ways, such as avoiding repeating things that aren't true, helpful, necessary or kind. Exercise caution in what is repeated/shared because of its effect on others.	Be active, critical consumers and sharers of information. Reinforce what makes a good community and consider what goes into building a reputation in relation to information sharing. Begin to explore the information environment and solutions to information pollution. Seek out quality information. Don't share information you know is untrue, that will hurt people. • Your information reputation is your credibility. Don't be an Information pollutor. Start to think about solutions for cleaning it up.	Express what it means to be responsible in the digital age. Exercise "click restraint" but don't share, or share with context. Use news literacy skills to justify positions and see the value of others' positions. Recognize the value of engaging with well-reasoned opinions based on sound evidence, including those with whom you disagree. Look across data sources and base decisions on a pattern of credible evidence. Actively put together a healthy media diet composed of multiple credible sources.	Demonstrate understanding of the pros and cons to citizen watchdogs/reporting. Identify ways to publish and amplify individual compositions. Demonstrate the ability to responsibly share information: Share, and provide alternative sources; and Share, with links to resistance sources. Actively de-echo chamber oneself. Extend one's media diet to include multiple platforms.

Throughlines: Participants in any community or community of practice, and of a democracy, have a responsibility to seek, confirm and share credible information; to control for information pollution; to consider the good of others and the whole; being informed is a prerequisite to engaging in productive civic discourse.

Choose One Prompt …
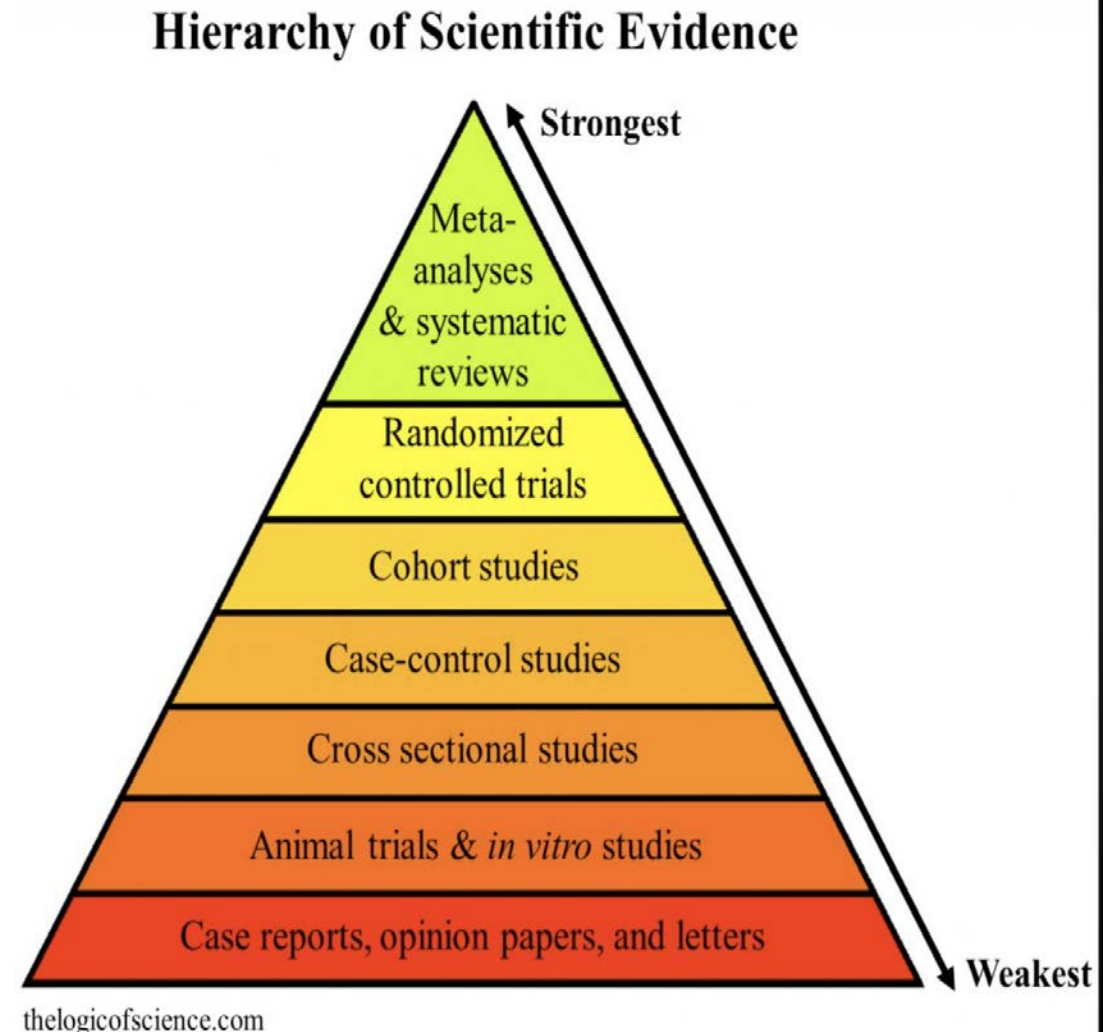
1. What was your biggest surprise from this section?

2. I used to think _____, but now I think _____.

Type "takeaways" into chat box

3. How would you share a central TAKEAWAY or INSIGHT with others?

4. I am now committed to rethink _____ (e.g. beliefs, actions, materials, methods, contexts…)

Challenges for citizens, teachers AND learners

1) Recognizing and controlling our own cognitive biases - and understanding that EVERYONE IS SUSCEPTIBLE to confirmation bias, availability bias, over-dramatization bias, binary bias, affiliation/identity biases, and much more

2) Misconstruction of how knowledge is constituted, what evidence needs to be, how it is constituted, and no practice with how to evaluate and use evidence

Hierarchy of Scientific Evidence

Strongest

- Meta-analyses & systematic reviews
- Randomized controlled trials
- Cohort studies
- Case-control studies
- Cross sectional studies
- Animal trials & *in vitro* studies
- Case reports, opinion papers, and letters

Weakest

thelogicofscience.com

An important starting point:
Know your own mind
or be manipulated!

When Jeff was growing up in rural Ohio there was a county

highway near his home with a series of Burma Shave signs

Don't lose

Your head

To gain a minute

You need your head

Your brains are in it
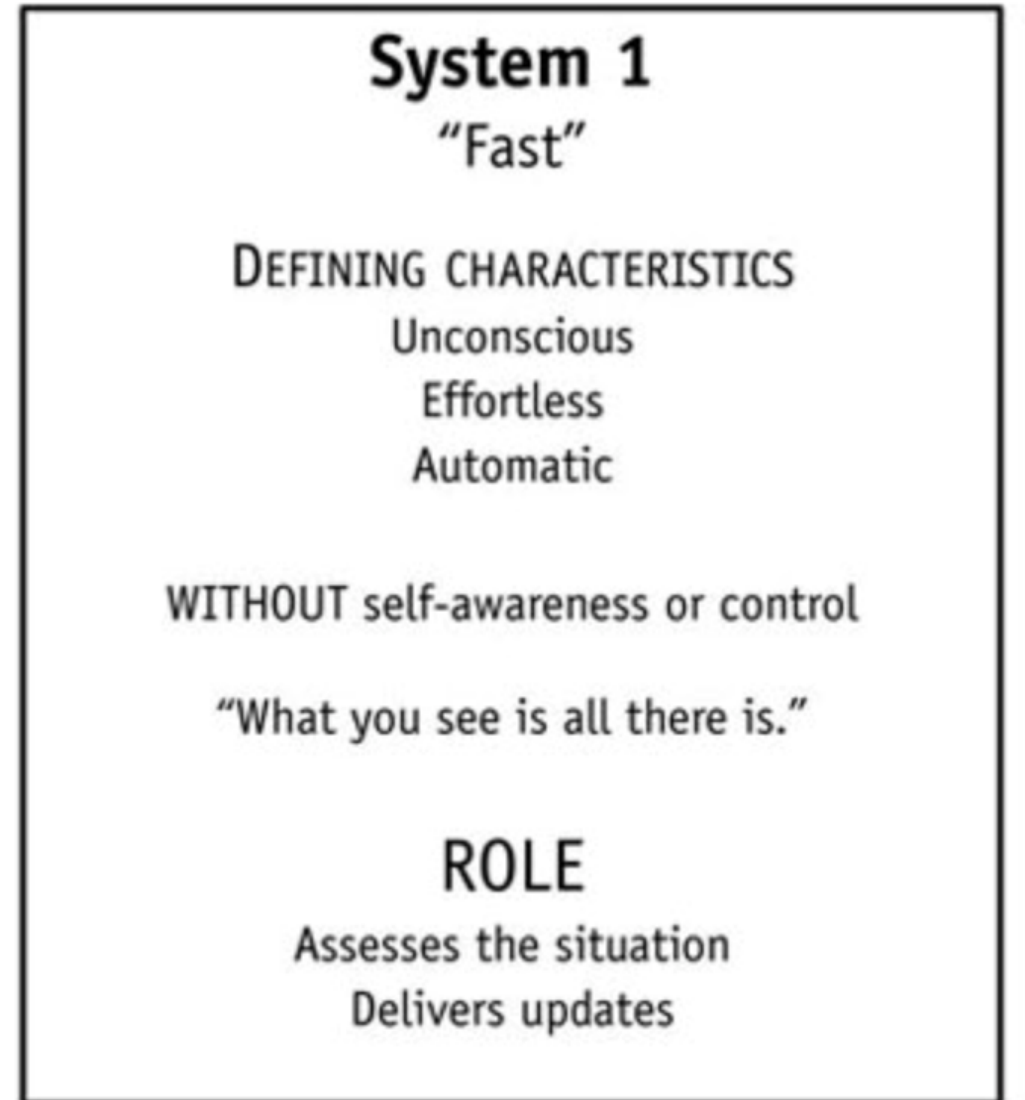
Why do we ALL believe and spread information pollution?

- cognitive and memory limitations, including deeply embedded cognitive biases

- pre-existing commitments, beliefs and identities

- directed motivations to defend or support our identity and group affiliations

- messages from other people, usually close to us and exercising influence on us, and the views of prominent influencers and political elites

- Anxiety + high-stakes information that matters to us

(Nyhan & Reifler, 2010)

System 1
"Fast"

DEFINING CHARACTERISTICS

Unconscious
Effortless
Automatic

WITHOUT self-awareness or control

"What you see is all there is."

ROLE

Assesses the situation
Delivers updates

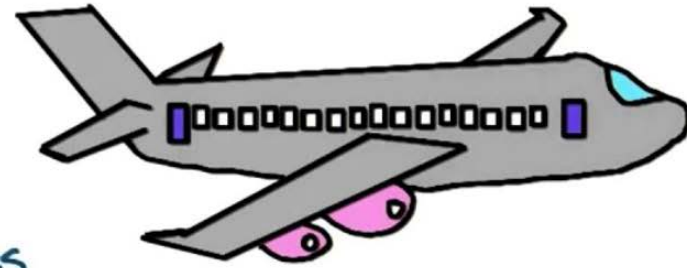# The Power of Untruthful Information Pollution – and Repetition of it . . .

We are programmed to believe everything we see and hear . . .

We have a primordial brain in a modern world . . .

Availability bias activity
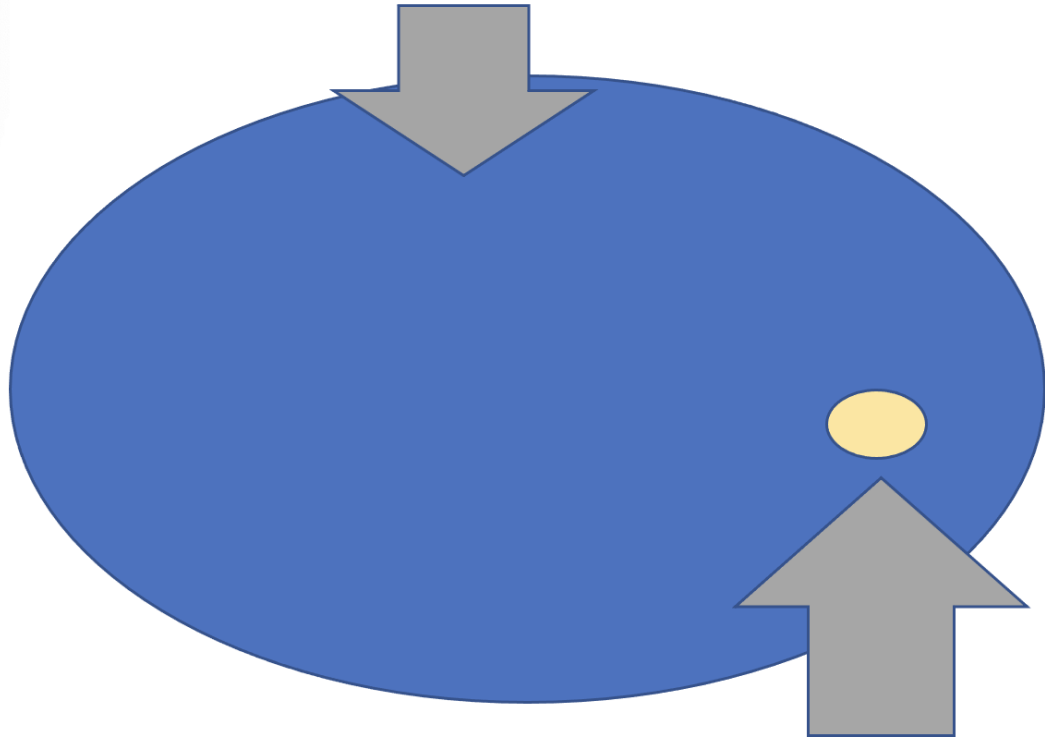
Learning about cognitive bias

What's Available:

What We Use: Recent, Frequent, Personal

I'LL NEVER FLY AGAIN!

THE DAILY JOURNAL

12 DIE IN AIRPLANE CRASH!!!

READ MORE INSIDE, A2

Confirmation bias activity
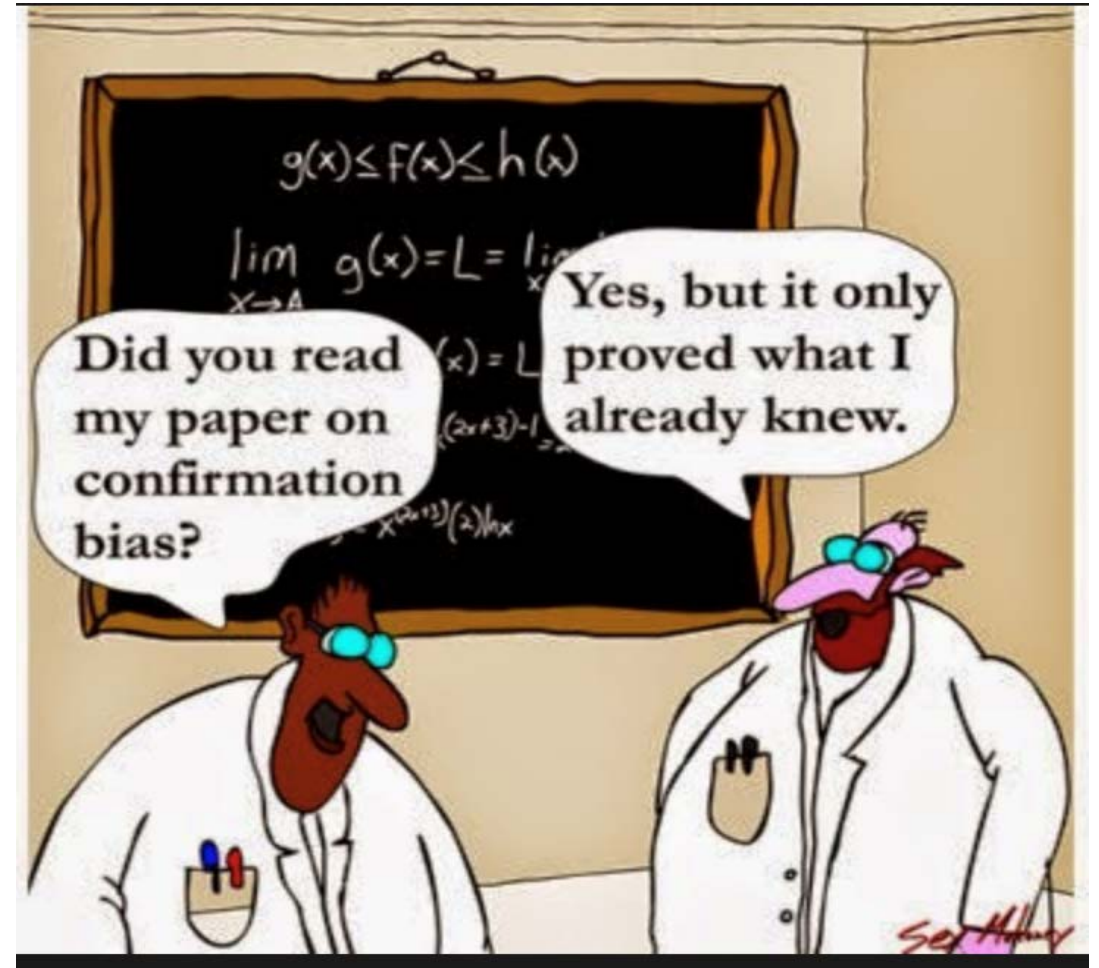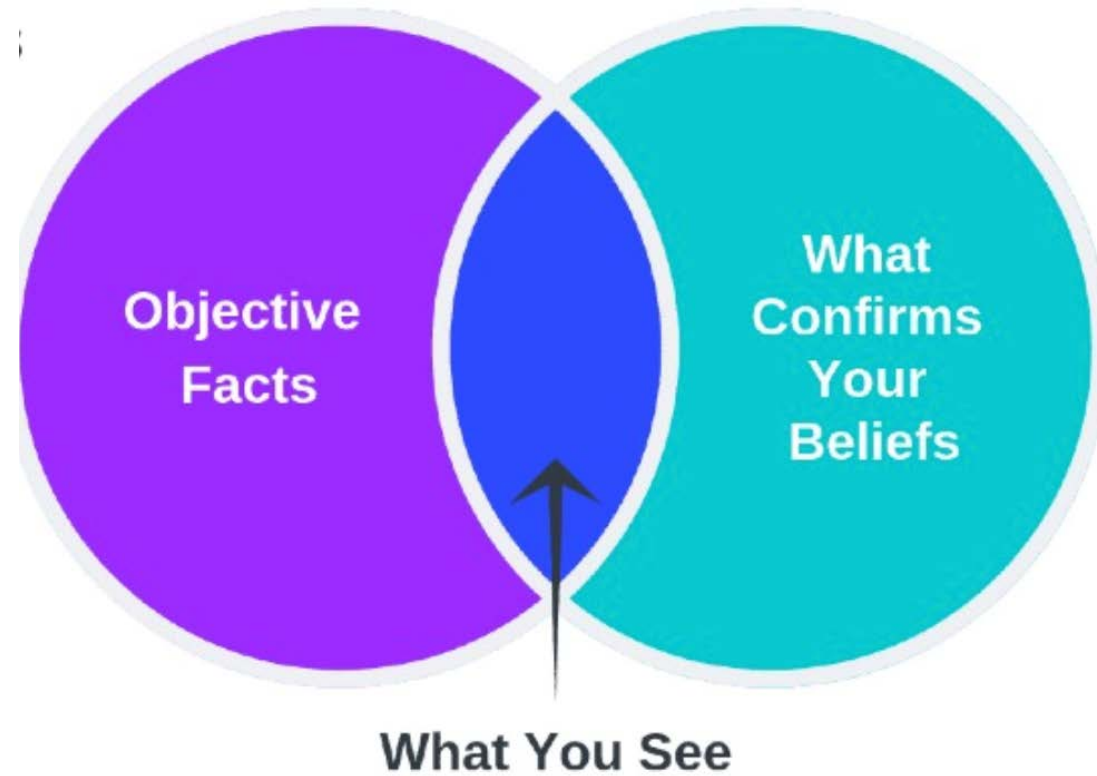
Confirmation bias
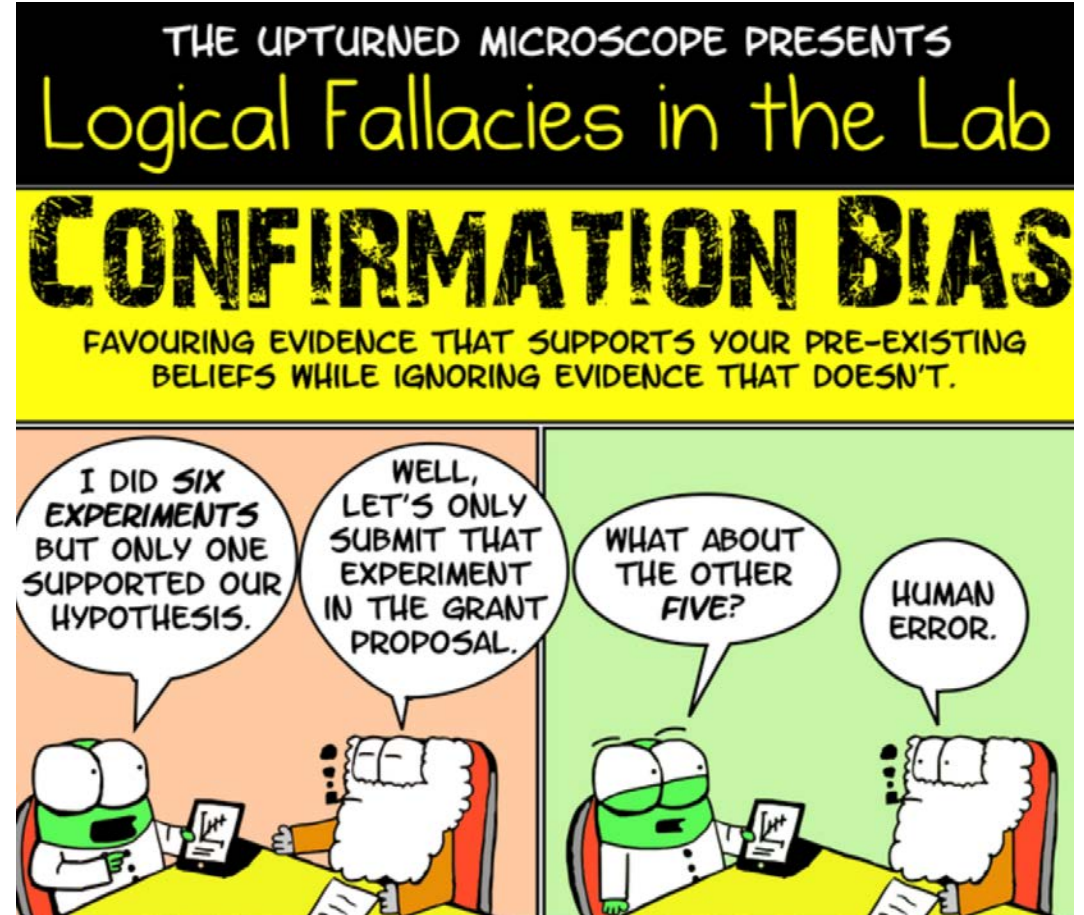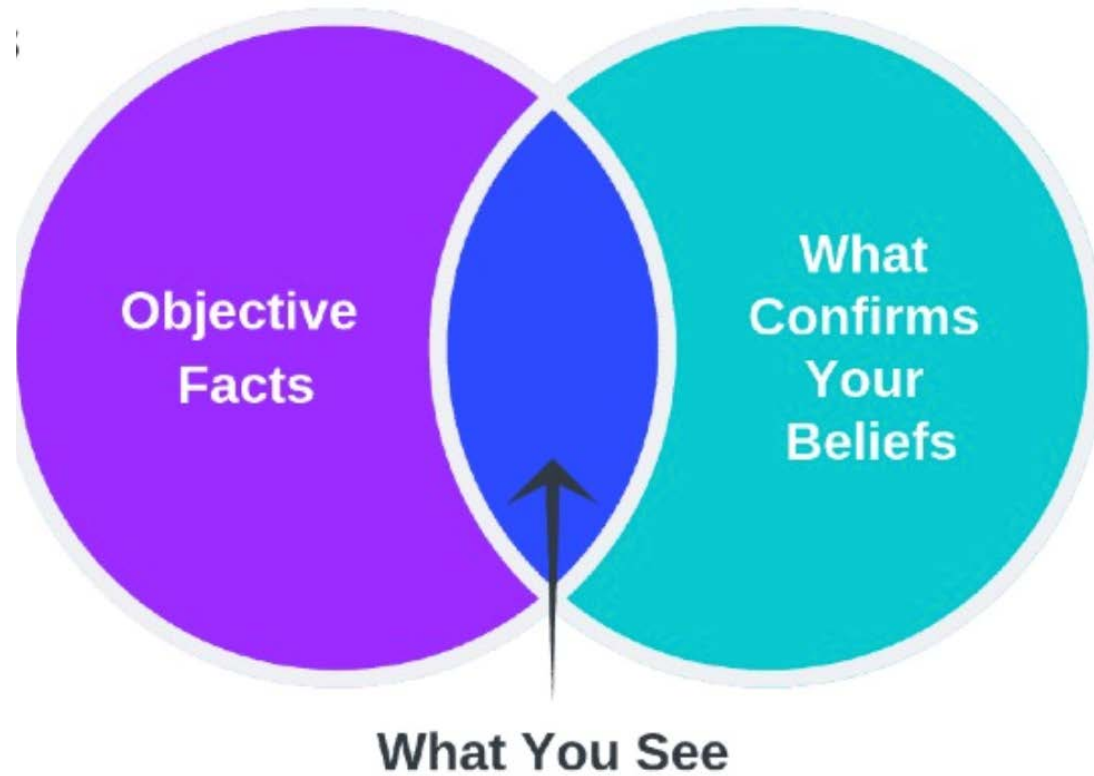
Adam Grant ✔
@AdamMGrant

Confirmation bias is twisting the facts to fit your beliefs. Critical thinking is bending your beliefs to fit the facts.

Seeking the truth is not about validating the story in your head. It's about rigorously vetting and accepting the story that matches the reality in the world.

Confirmation Bias: Think of an example of confirmation bias you've experienced or observed?

Examples of Confirmation Bias

Not seeking out objective facts

Interpreting information to support your existing belief

Only remembering details that uphold your belief

Ignoring information that challenges your belief

Student generated images about bias
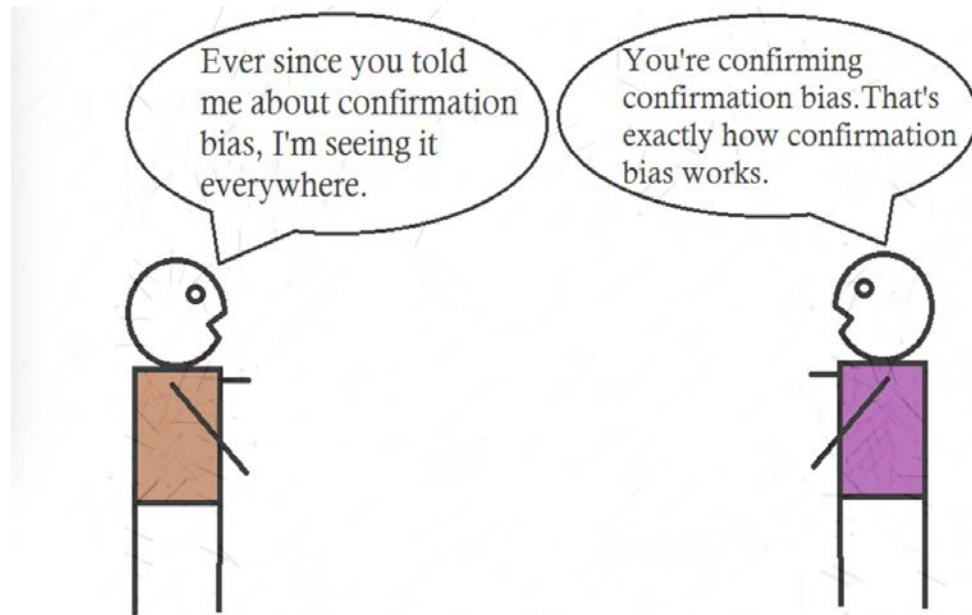
Activity: True or false?

- Tigers eat people.

- Mosquitoes transmit the West Nile Virus.

Overdramatization biases: The Gap Instinct: Reality exists on a continuum, not on extremes.

- Tigers eat people.

It is the very rare and only a very weak tiger who might eat a human.

(*Maneaters of Kumaon,* Corbett)

- Mosquitoes transmit the West Nile Virus.

Only 2-20% of mosquitoes are carriers in areas where there is West Nile. Only .0002% of people bitten by a carrier have the disease transmitted to them.

(NIH)

1. Locate the majority

Look at the gap!
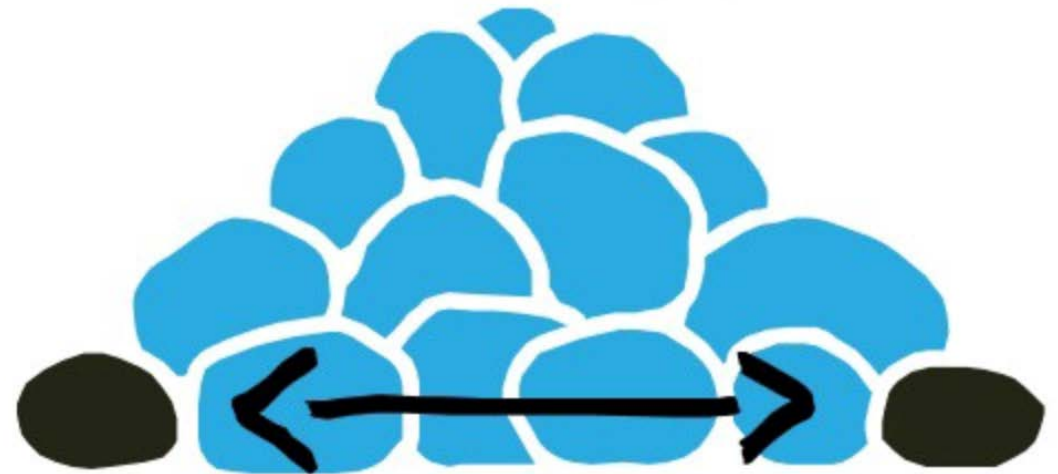
What gap?

A Critical Context: Use Guided inquiry which looks at all perspectives and interrogates our own biased perspectives

"When we must decide between believing the facts or belonging, belonging always wins."

-Zeynep Tufecki

"Truth was never bested by a bad argument, unless all the arguments were not made."

-John Milton

E Envision **M** Map **P** Prime **O** Orient **W** Walkthrough **E** Engage **R** Reflect
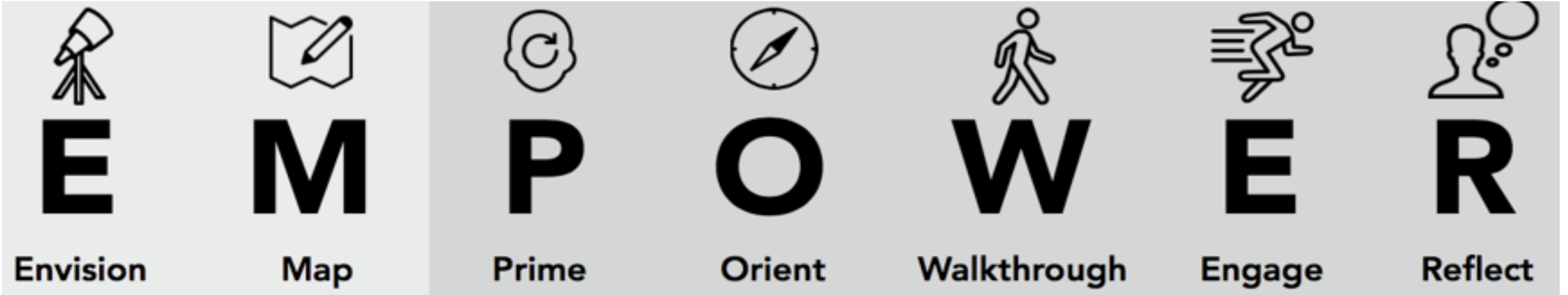
- Through guided inquiry addressing important or required topics and strategies

- Embed instruction in media/news literacy, evidence and reasoning, positioning and point of view, cognitive bias and control, rules of notice, critical lenses in such units

LOTS OF DELIBERATE

PRACTICE!! TWO-FERS

PEOPLE! MAKE THE

CONNECTIONS!

SIX ELEMENTS OF DELIBERATE PRACTICE

| Clear and specific goals (EM) | Preparation for success (PO) | Focused practice (WE) | Pushing beyond one's comfort zone (WE) | Receiving high-quality feedback (R) | Developing a mental model of the expert task (R) |

FIGURE I.1: CHART COMPARING EMPOWER TO DIFFERENT GUIDED INQUIRY MODELS

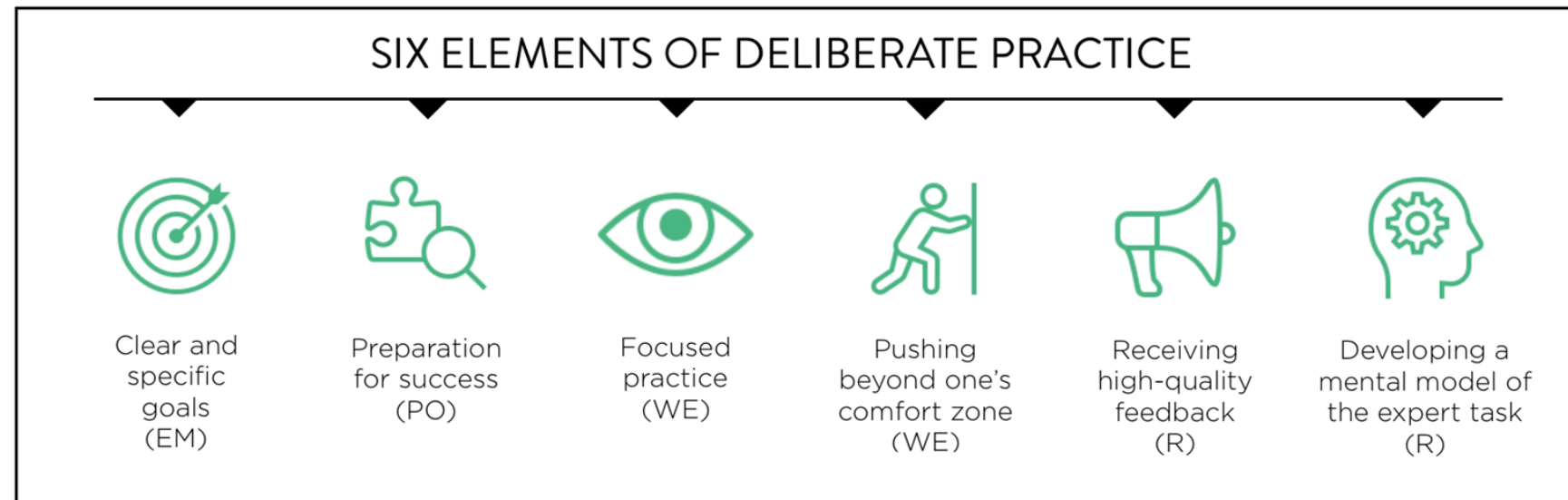| EMPOWER	SYSTEMS CONNECT	PROJECT-BASED LEARNING (PBL)	INTEGRATED INQUIRY (INTERNATIONAL BACCALAUREATE)	UNDERSTANDING BY DESIGN (UBD)	VESTED	SHELTERED INSTRUCTION OBSERVATION PROTOCOL (SIOP)	6 E'S	TEACHING FOR UNDERSTANDING
Envision	Topic selection and learning objectives	Key knowledge	Transdisciplinary theme	Stage 1: What is worthy and requiring of understanding?		Lesson prep	Engage	Use topics that engage and connect to other subjects
Map	Essential/driving questions; context; define issues and measurable changes		Tuning in		View	Building background		Create coherent goals
Prime		Challenging problem or question and student voice		Stage 3: What learning, experiences, and teaching promote understanding, interest, and excellence?				
Orient								
Walk Through	Plan and conduct investigations; analyze and interpret data; construct explanations; develop claims, informed action	Sustained inquiry, authenticity	Finding out, sorting out, going further, making conclusions		Experience Speak	Comp. input strategies Interaction	Explore Explain	Create engaging learning experiences
Extend and Explore		Public product	Going further; taking action	Stage 2: What is the evidence for understanding?	Transform Extend Deliver Perform	Practice/application Lesson delivery Review and assessment	Elaborate Extend	
Reflect		Reflect					Evaluate	Develop formative and summative assessment that deepen understanding

EVERY STEP IS ESSENTIAL!

When an educator does not _____, then it usually causes learners to feel or be _____ .

M Map	P Prime	O Orient	W Walkthrough	E Engage	R Reflect	=	**AIMLESS**
E Envision	P Prime	O Orient	W Walkthrough	E Engage	R Reflect	=	**OVERWHELMED**
E Envision	M Map	O Orient	W Walkthrough	E Engage	R Reflect	=	**DISCONNECTED**
E Envision	M Map	P Prime	W Walkthrough	E Engage	R Reflect	=	**UNMOTIVATED**
E Envision	M Map	P Prime	O Orient	E Engage	R Reflect	=	**UNSKILLED**
E Envision	M Map	P Prime	O Orient	W Walkthrough	R Reflect	=	**UNCHALLENGED**
E Envision	M Map	P Prime	O Orient	W Walkthrough	E Engage	=	**DEPENDENT**

Building Expertise Through Disciplinary Literacies in a context of use: situated, integrated cognition
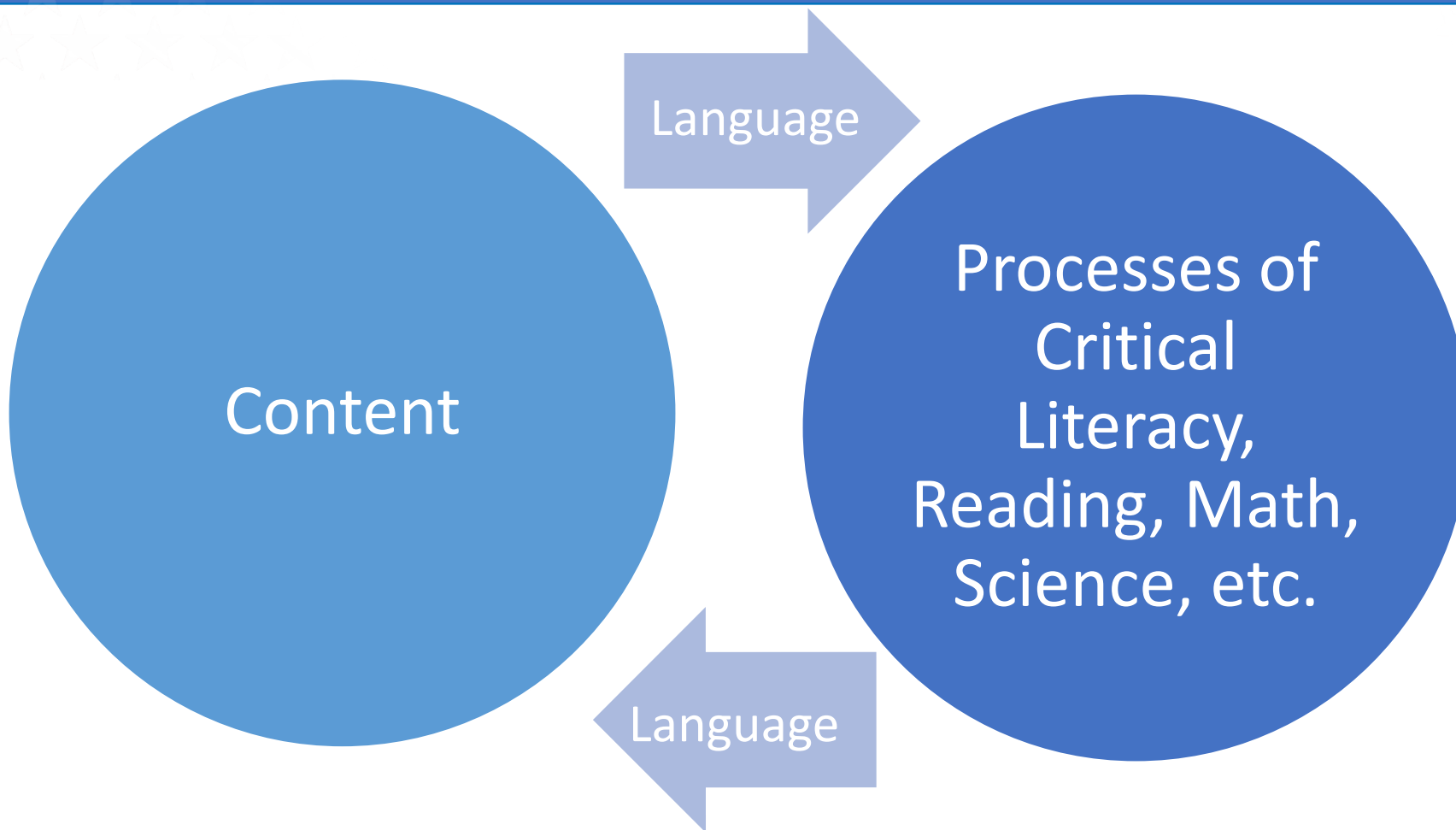
Ericsson on how to achieve expertise

1. **a mental model:** a highly conscious and articulated representation of a task and how to complete it

2. **deliberate practice:** mindful focused practice aligned with "correspondence concept"

Practice makes Perfect . . .
NOT!- Practice makes PERMANENT

So, you better be darn careful what you practice and how you practice . . .

We must deliberately practice in ways that lead us towards expertise, that use the mental models of experts, that move us down the correspondence concept continuum.

Consider this . . .

What is one thing you could do to help yourself and help young people recognize and control for availability, confirmation or overdramatization biases?

So What Can We DO? Ways to identify and Control for Information Pollution – that support mental health and more accurate worldview

The answer is instruction.   All solutions to all problems require instruction and deliberate practice!

Including
1) instruction and practice to support *self-study* of our minds and biases

2) Instruction and practice to develop student's capacity for *identifying and interrogating* information pollution and developing thoughtful and defensible claims

Self-Studying
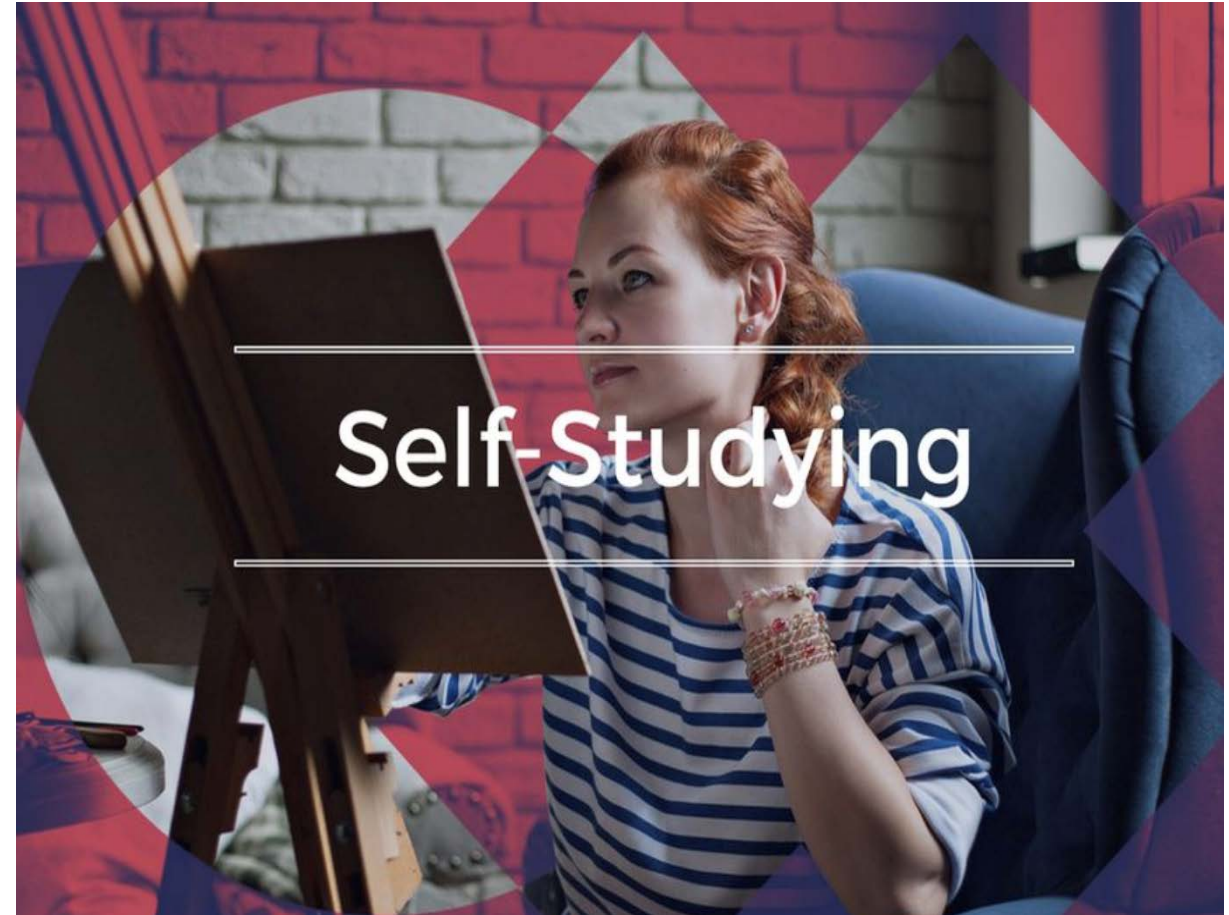
Understanding Unreliable Narrators- in literature and in life . . .

- Understanding Irony
1. Reject the surface meaning
2. Decide what is not under dispute in the text/utterance, i.e. what we can believe and accept
3. Apply knowledge of the world to generate a reconstructed meaning of what *is* under dispute, and if possible check what you think against knowledge of the author (Smith, 1989)

TIP OFFS OF IRONIC DISCOURSE

*A straightforward warning that we might need to read carefully or that we shouldn't believe everything we read

*A speaker in the text proclaims a known error (thereby distancing the author from the speaker e.g. "since the sun revolves around the earth . . ."

*There is a conflict between what characters think or say

*There is a conflict of belief between characters, or a character believes something we find hard to justify (e.g. that we should eat babies to solve the population problem – Swift's "A Modest Proposal")

*There is a clash of style- some information is presented in a different way stylistically   (from Wayne Booth, *Rhetoric of Irony)*

Understanding Unreliable Narrators- in literature and in life . . .

- **Understanding Unreliable narrators**
1. Is the narrator too self-interested to be reliable?
2. Is the narrator sufficiently experienced to be reliable?
3. Is the narrator sufficiently knowledgeable to be reliable?
4. Is the narrator sufficiently moral to be reliable?
5. Is the narrator too emotional to be reliable?
6. Are the narrator's actions too inconsistent with his or her words to make him or her reliable? (Smith, 1991, 16)

Once the narrator has been determined to be unreliable, readers go through a similar process to reconstructing ironic subtextual meaning. They must then check the facts of the situation and decide what is under dispute, and then apply their knowledge of the world to figure out what must really have happened or what the facts really must be (Smith, 1991).

The COR (Civic Online Reasoning) Questions, Sam Wineburg and SHEG

Who is behind this information? (and how reliable and credible are they?)

What's the provided evidence?

(and how strong and authoritative is it?)

What do other sources say? (is the position supported by lateral reading?)

Step 1

Use the sequence of lessons provided by SHEG to introduce students to each of these COR questions.

1. Who is behind this information?
2. What's the evidence?
3. What do other sources say?

You can dig deeper into Question 1 by asking:

- Is the source(s) authoritative?

And into Questions 2 and 3 by asking:

- Is the evidence credible and safe?
- Is the evidence from an authoritative source?
- Is the evidence repeated across sources? (employ lateral reading!)
- Is the evidence relevant (i.e., on point for our current questions or inquiry)?

Step 2

Model how to use the COR protocol with a text from the unit at hand: You do it *for* the students. Invite students to join in and help out: doing the work *with* you. After some run-throughs students should be able to use the protocol on their own, *by* themselves, or with a peer, and if not, you can do more work with them. (This is the *for-with-by protocol* for gradual release of responsibility.)

DELIBERATELY PRACTICE THE MENTAL MODELS!
Elvis is the greatest singer of all time! (claim)

He has sold more records than any other performer!

His movies are still shown on TLC!

He had a unique combination of charisma and talent.

(assess the evidence)

One big insight about arguments:

They have to build on a solid foundation of "safe" and "checkable" evidence:

You should retire to Boise:

It's a great place to live

vs.

It's high desert

Semantic Scales:
Analyzing Evidence

SAFETY OF EVIDENCE/ACCEPTABILITY AND VERIFIABILITY	
Is Safe, can be agreed upon	Unsafe, Illogical and Untrue

AUTHORITY OF SOURCE/s	
Positive	Negative

REPLICABILITY OF EVIDENCE – established through lateral reading	
Repeated/Replicable	Not repeated/Not replicable

Relevance of Evidence – ON-POINTNESS for our topic, inquiry or my claim about a topic of inquiry	
Clearly Relates to Topic	Does not relate to topic

Validity of Evidence – COLLECTION OF DATA IS SOUND	
Sound collection of data	suspect collection/methodology

Sufficiency of Evidence – patterns of evidence across credible sourse

One worry about and one benefit of text-based arguments:

Evidence isn't under dispute.

You must reason from the evidence.

2. **Claim: I need to have an increase in my allowance.**

Audience: Your parents or caregivers.

____A. All the kids in my class get more allowance than I do.

____B. The prices of the things I buy with my allowance have gone up quite a lot due to inflation.

____C. As reported in *US News and World Report*, parenting experts agree that allowances in return

for chores teaches a strong work ethic, financial literacy, fiscal responsibility, a sense of what it takes

to run a household and a sense of familial belonging.

____D. A recent poll of 2,505 teens showed that the average amount of allowance for 13-15 year-olds

was over $13 and I only get $5.

____E. According to Kaitlyn Laurie, a child and adult psychotherapist in Madison WI, if kids'

allowances aren't enough, it gives kids "the impression things come too hard".

I SAW IT ON THE INTERNET
IT MUST BE TRUE
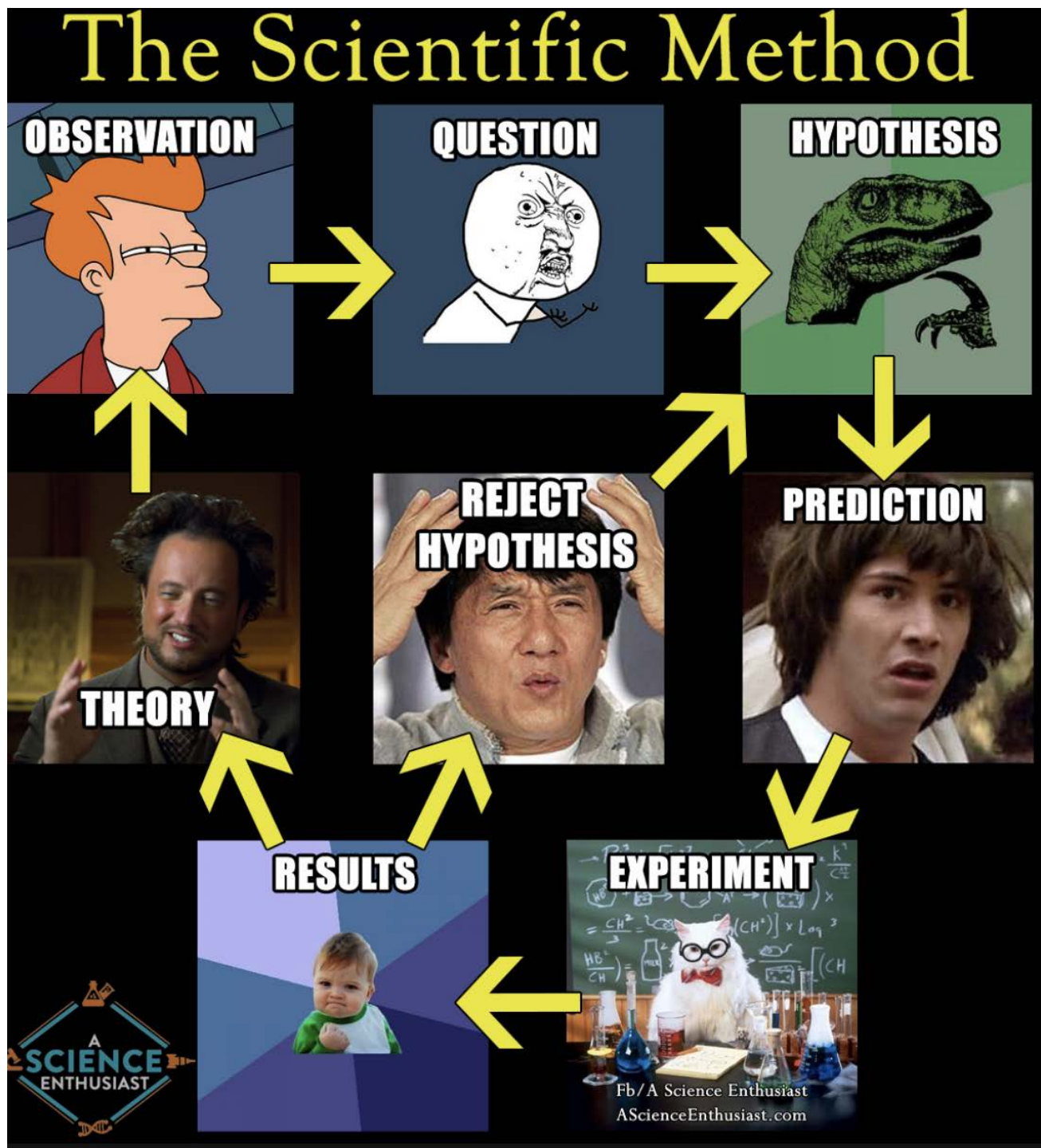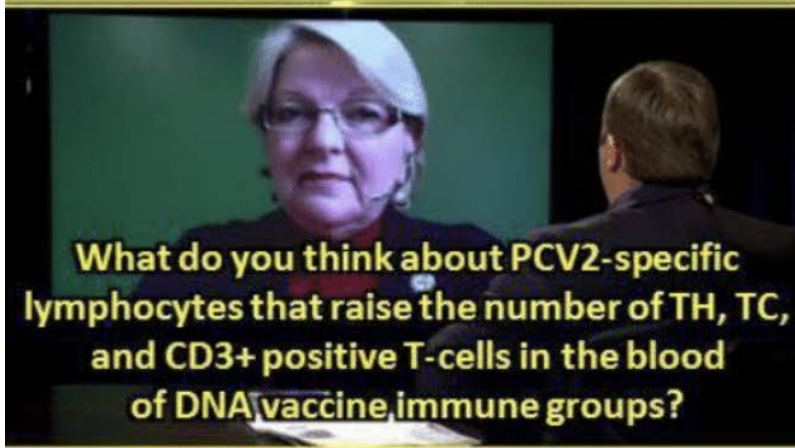
THE CONSPIRACY CHART

DETACHED FROM REALITY

QAnon · DEEP STATE · ELDERS OF ZION · Celebs moisturize with children's foreskin · Flat Earth · REPTILIAN OVERLORDS

Follow the White Rabbit · GEORGE SOROS · WHITE GENOCIDE · NEW WORLD ORDER · Bill Gates microchipping · Holocaust denial · WayFair

"Cultural Marxism" · Adrenochrome · Mars slave colony

Illuminati · Sandy Hook fake · Satanic cult panic · Obama birth certificate fake · PizzaGate

Subliminal messages from ruling class on children's TV · MOON LANDING FAKED · Nazis on the moon · HOLLOW EARTH · "Antifa international" starting wildfires

WORLD RULED BY SUPREME SHADOW "ELITES." ONCE YOU BELIEVE ONE YOU USUALLY BELIEVE MOST. GET HELP.

THE ANTISEMITIC POINT OF NO RETURN

Jet fuel doesn't melt steel beams · GLOBAL WARMING HOAX · Finland doesn't exist · 5G · Government-made diseases · Essential oils cure all illnesses

Anti-Vaxxers · Soy boys · COVID-19 made in lab · Dinosaurs didn't exist · Chemtrails

DANGEROUS TO YOURSELF AND OTHERS

SCIENCE DENIAL

Avril Lavigne replaced · The Beatles never existed · CROP CIRCLES · Greta Thunberg is a time traveller · Bigfoot

Elvis lives · Aliens built Stonehenge · Alien abductions · Loch Ness monster

Prince Charles vampire · Mattress Firm · CRYPTIDS

Credit @tofology

UNEQUIVOCALLY FALSE BUT MOSTLY HARMLESS

LEAVING REALITY

#FreeBritney · Marilyn Monroe · JFK assassination

Denver Int'l Airport · Roswell · UFOs · Area 51

EPSTEIN DIDN'T KILL HIMSELF · Princess Diana

WE HAVE QUESTIONS

SPECULATION LINE

COINTELPRO · Operation Mockingbird

Big Tobacco lied about cancer · NSA mass surveillance

NAYIRAH TESTIMONY · Tuskegee

FBI spied on John Lennon

MKUltra

Bohemian Club

THINGS THAT ACTUALLY HAPPENED

Credit @tofology

GROUNDED IN REALITY

I've done my research on vaccines

What do you think about PCV2-specific lymphocytes that raise the number of TH, TC, and CD3+ positive T-cells in the blood of DNA vaccine immune groups?

😂😂😂

The Scientific Method

OBSERVATION → QUESTION → HYPOTHESIS

THEORY ← RESULTS ← EXPERIMENT

REJECT HYPOTHESIS

PREDICTION

A SCIENCE ENTHUSIAST

Fb/A Science Enthusiast
AScienceEnthusiast.com

Levels of Scientific Evidence,

with Dr. Kat

Scientific evidence can be confusing! It's easy to mistake weak evidence for strong evidence. Sometimes people share unreliable things on social media with good intentions, but sometimes they're exploiting the public's lack of understanding of different levels of evidence. We all encounter claims online, but *all evidence is not created equal.* So, how can you tell the quality? This infographic can help you find your way.

News Literacy Project

This infographic was developed by the **News Literacy Project** and **Dr. Katrine Wallace**, an epidemiologist and assistant professor at the University of Illinois at Chicago. *Follow Dr. Kat on TikTok* @epidemiologistkat.

newslit.org   A future founded on facts

TIP   **Scientific evidence in the news**

News reports and opinion pieces about scientific topics might cite a mix of different kinds of evidence. Be sure to examine what type is being presented: *Is it quoting an expert? Is it a "study"? What kind of study?* Refer back to the pyramid to evaluate the quality of evidence included. (And don't forget to check the date! If the study or date of the news report is old, the data might have changed.)

Scan here to watch Dr. Kat lead you through this chart!

META-ANALYSIS

Statistical method that combines the results of multiple scientific studies.

Example: Connection between intelligence test scores and education.

RANDOMIZED TRIAL

The gold standard for *testing* health claims. (The top layer does not include experiments but summarizes them.) Researchers randomly assign participants to groups to make fair comparisons and test treatments in ways that minimize bias.

Example: Pfizer COVID-19 vaccine trials.

CASE-CONTROL STUDY

A study that compares a group of individuals with a specific condition to a group of people without that condition to find out what may have caused it.

Example: A study used to determine a link between smoking and lung cancer.

Don't forget! Correlation does NOT equal causation.

CASE REPORT / CASE SERIES

A study on one person (report) or one group (series) of people with similar clinical characteristics. Because these studies don't make comparisons, they aren't as strong as the evidence in higher levels of the pyramid.

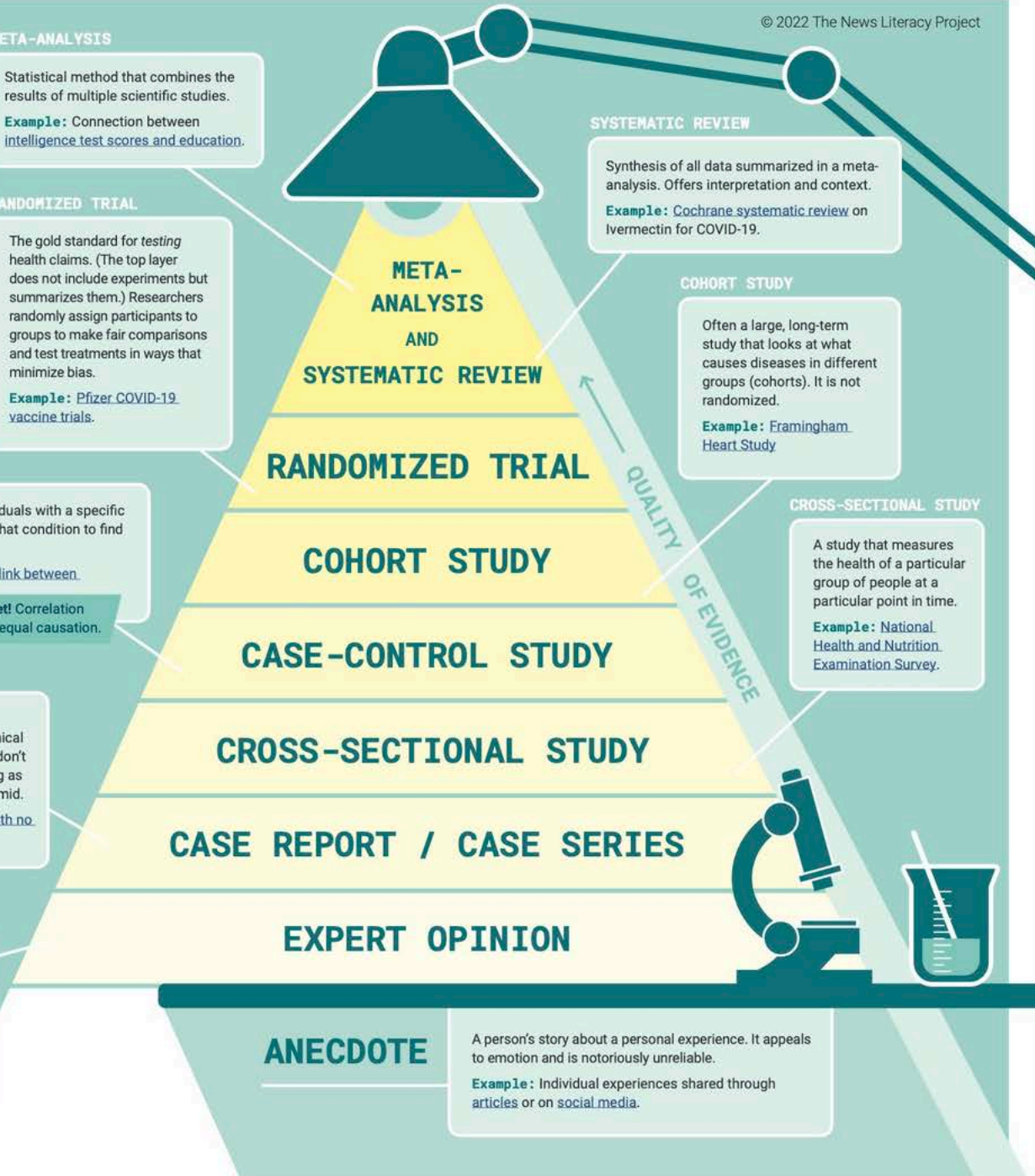**Example:** Interesting cases reported with no control group.

EXPERT OPINION

An educated opinion presented without data. More prone to bias. Can be useful before we have reliable data on a topic. (That said, expert opinion should shift to be evidence-based!)

Example: Nutrition opinion piece.

SYSTEMATIC REVIEW

Synthesis of all data summarized in a meta-analysis. Offers interpretation and context.

Example: Cochrane systematic review on Ivermectin for COVID-19.

COHORT STUDY

Often a large, long-term study that looks at what causes diseases in different groups (cohorts). It is not randomized.

**Example:** Framingham Heart Study

CROSS-SECTIONAL STUDY

A study that measures the health of a particular group of people at a particular point in time.

**Example:** National Health and Nutrition Examination Survey.

Pyramid levels (top to bottom):

- META-ANALYSIS AND SYSTEMATIC REVIEW
- RANDOMIZED TRIAL
- COHORT STUDY
- CASE-CONTROL STUDY
- CROSS-SECTIONAL STUDY
- CASE REPORT / CASE SERIES
- EXPERT OPINION

QUALITY OF EVIDENCE

ANECDOTE

A person's story about a personal experience. It appeals to emotion and is notoriously unreliable.

Example: Individual experiences shared through articles or on social media.

VACCINE RESEARCH LABORATORY

200 YEARS OF RESEARCH & DEVELOPMENT
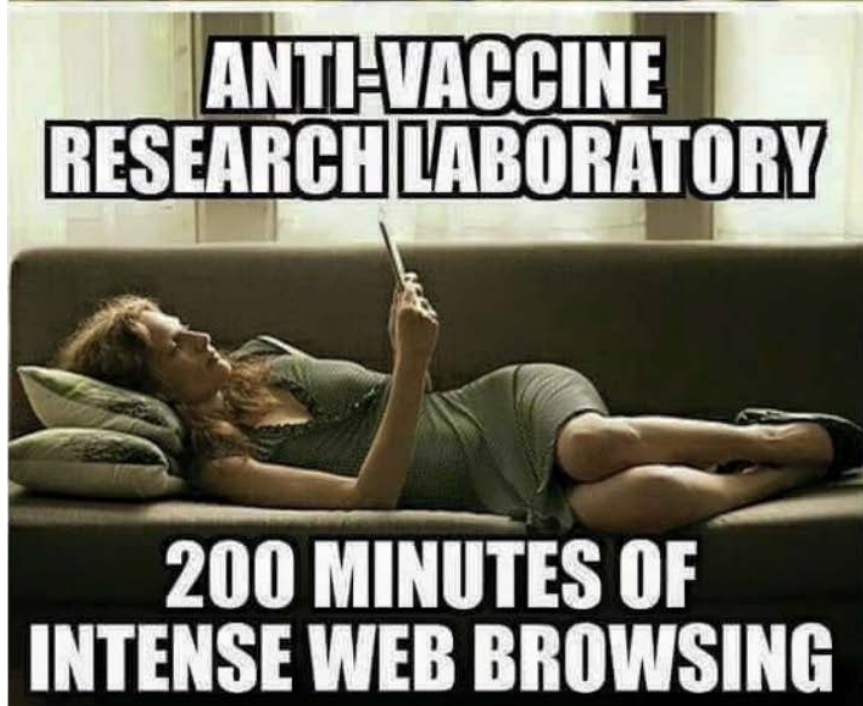
ANTI-VACCINE RESEARCH LABORATORY

200 MINUTES OF INTENSE WEB BROWSING
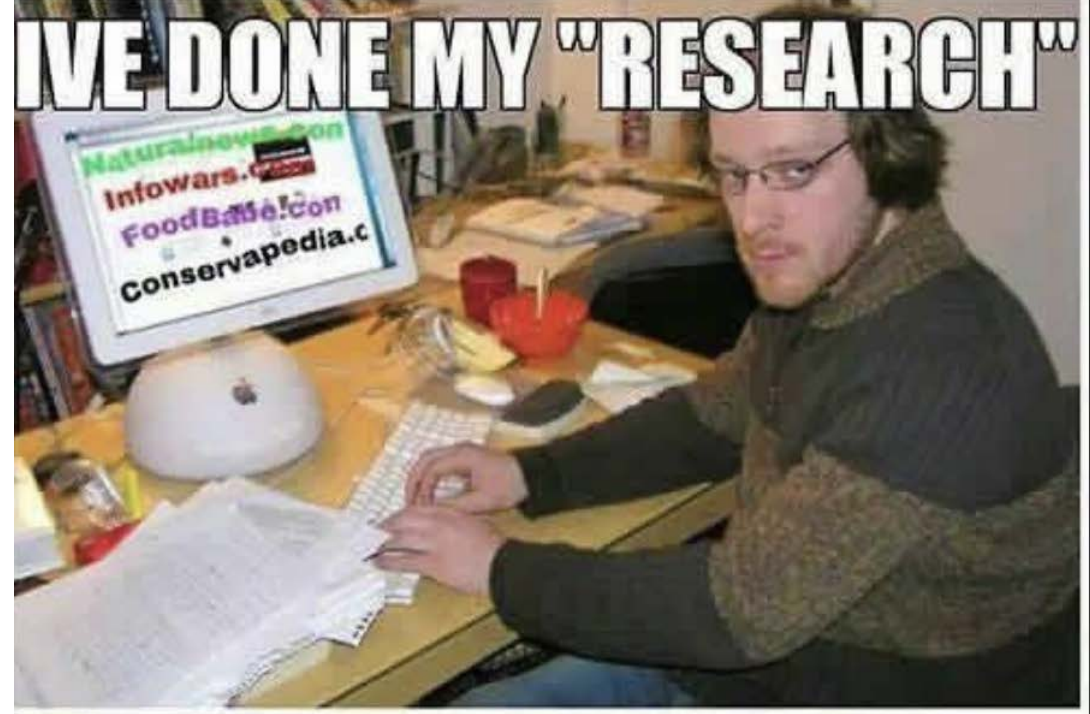
IVE DONE MY "RESEARCH"

THAT'S CUTE

All facts are not created equal- 5 questions for evaluating research and "research" based evidence

Who is doing the study? (authoritative source? Conflicts of interest?)

Who are the participants? (underrepresentation of women, elderly, BIPOC, different education levels?)

What causes what? (correlation is not causation)

What instruments were used and are they biased or credible? (Republican pre-election survey: "'Who do you trust more to protect America from foreign and domestic threats?' and offers choices of (a) President Trump or (b) a corrupt Democrat.")

Can I reason from a single story? (only if done deliberately, and after considering if there might be different stories and perspectives that are being ignored - if you have exercised your sociological imagination)

5 Key Questions: Evaluating Research and evidence from "research"

Question 1: Who's doing the study?

Question 2: Who are the participants?

Question 3: What causes what?

Question 4: What instruments are used?

Question 5: Can I reason from a single story?
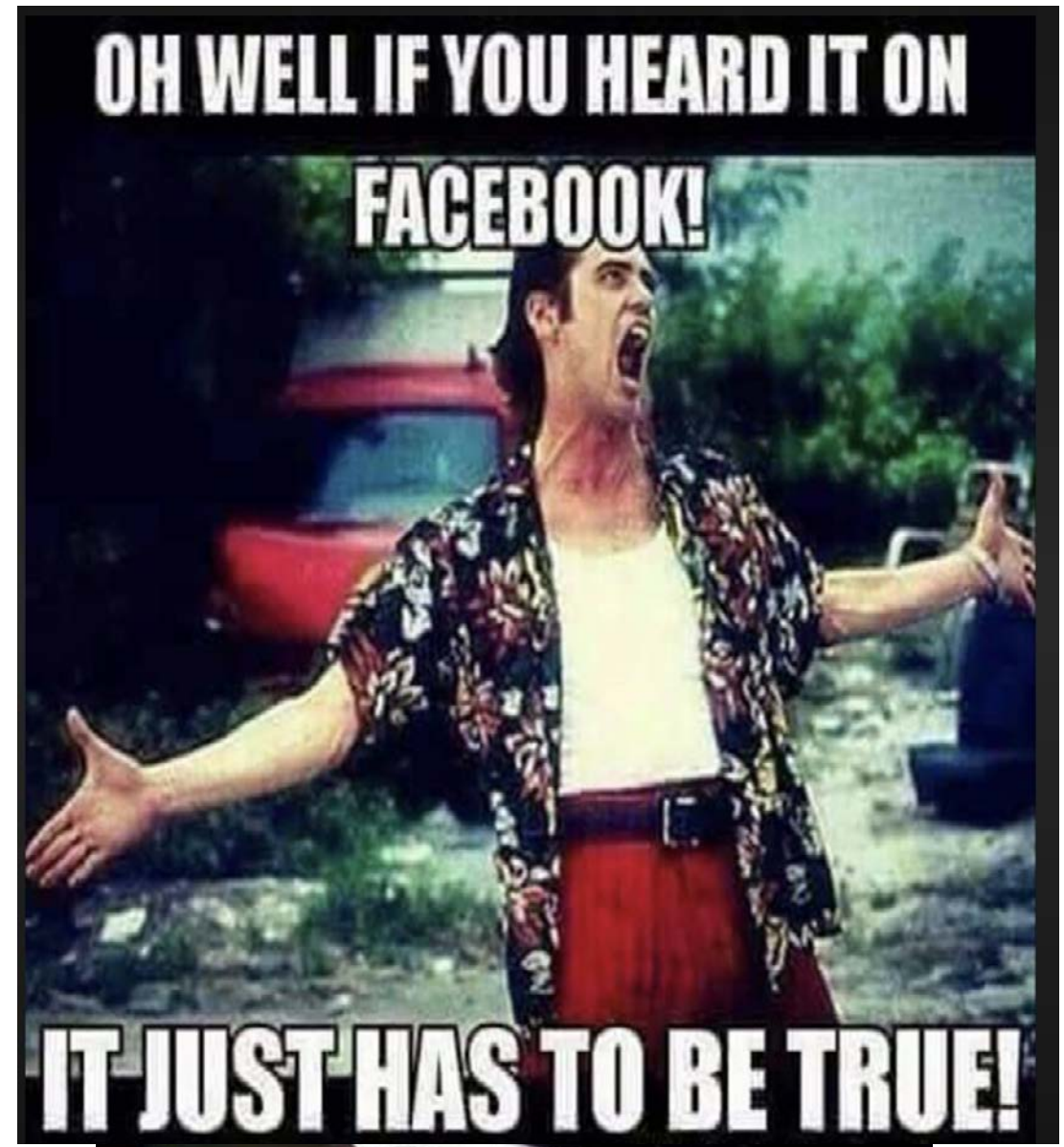
influencingthings
@influencingthi1

We're all about great shampoo!

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We asked our #HairLife squad what they thought of @nutrientplusshampoo. 100% said it aided in hair regrowth #believe

Illeism to gain perspective and context

• Igor Grossman: Wise reasoning is made of reflective "metacognitive components" – including intellectual humility, acknowledgement of others' viewpoints and the limitations of one's own, categorical tentativeness, a search for compromise . . .

• By switching to the third person, our descriptions of a situation will start to sound as if we are talking about someone else rather than ourselves. This sense of detachment allows us to see the bigger picture, rather than getting caught up in our own feelings.
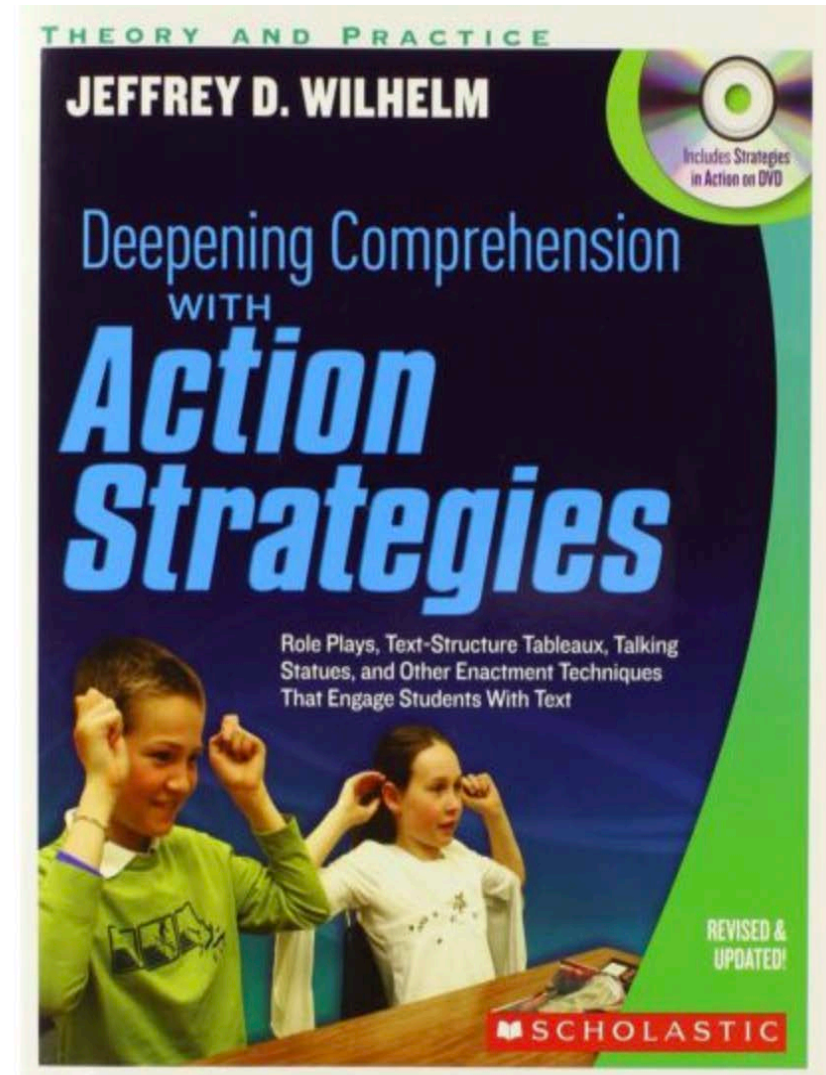
Illeism used to gain perspective and context

This is exactly what Grossman and Kross found in their studies:

They showed that people employing illeism to talk about their positions, experiences, and problems showed greater intellectual humility, greater capacity to recognize others' perspectives, and a willingness to reach compromise – increasing their overall "wise reasoning" scores, reducing anxiety about themselves and individual circumstances, etc.
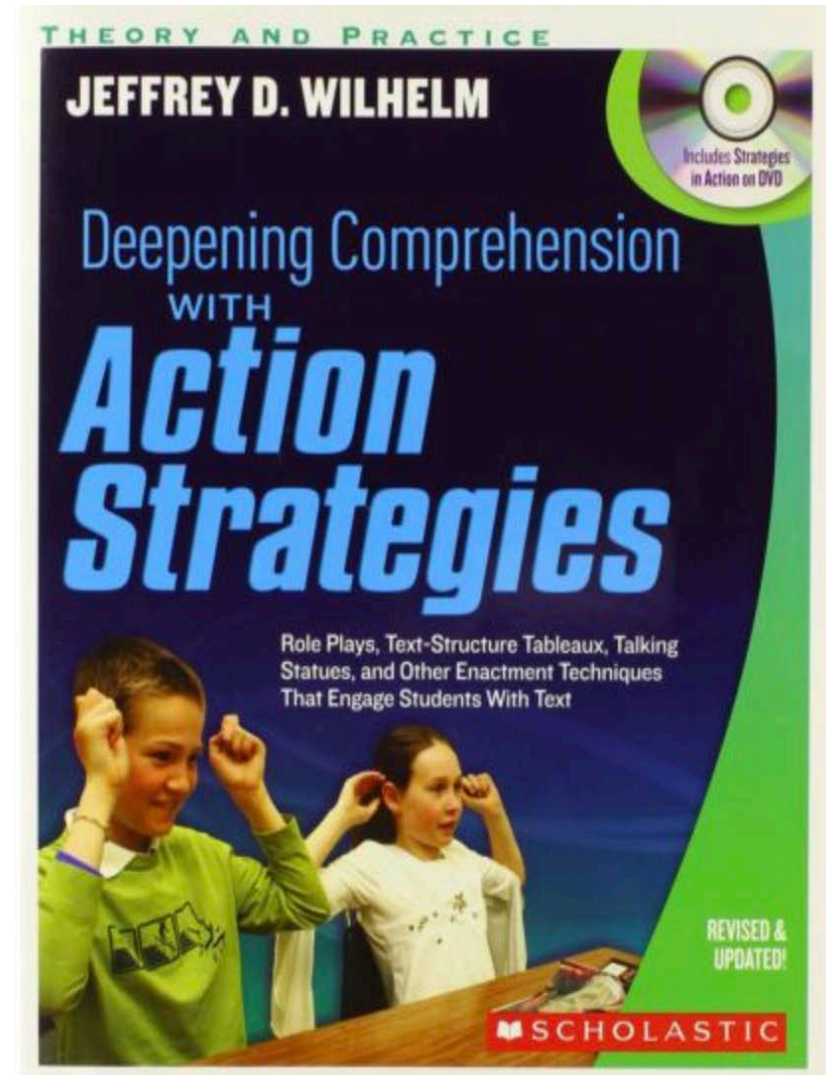
What if? An exercise in social imagination

- You lived in the 19th Century?
- Were African American (or another race)?
- Had grown up in different, e.g. more impoverished circumstances?
- Had grown up without access to school?
- Had a loved one denied life-necessary medical care?

The Sociological Imagination

The Sociological Imagination is stimulated by a willingness to **view the social world from the perspective of others.**

It involves moving away from thinking in terms of the individual and their problems, **focusing rather on the social circumstances that produce social problems.**

I worry about the decreased polarization of our society
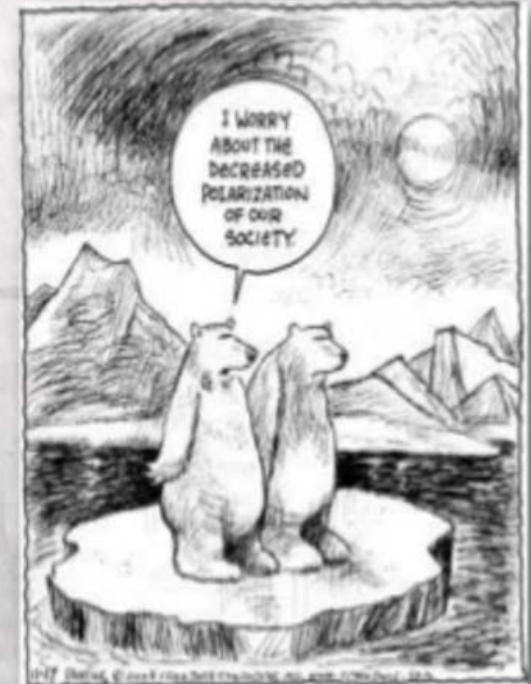
Use ALLSIDES

AllSides™ Media Bias Chart™

Ratings based on online, U.S. political content only — not TV, print, or radio.
Ratings do not reflect accuracy or credibility; they reflect perspective only.

L LEFT	L LEAN LEFT	C CENTER	R LEAN RIGHT	R RIGHT
ALTERNET	abc NEWS	AXIOS	THE DISPATCH	The American Conservative
BuzzFeed News	AP	BBC	THE EPOCH TIMES	THE AMERICAN SPECTATOR
CNN	The Atlantic	The Christian Science MONITOR	FOX BUSINESS	BREITBART B
DEMOCRACY NOW!	Bloomberg	Forbes	IJR. INDEPENDENT JOURNAL REVIEW	THE BLAZE
DAILY BEAST	CBS	MarketWatch	NEW YORK POST news	CBN
HUFFPOST	theguardian	NEWSNATION	The Post Millennial.	DAILY CALLER
The Intercept_	INSIDER	Newsweek	reason	Daily Mail
JACOBIN	NBC	REUTERS	THE WALL STREET opinion JOURNAL	DAILY WIRE
MotherJones	The New York Times news	REAL CLEAR POLITICS	WASHINGTON Examiner	FOX NEWS channel
msnbc	npr	THE HILL	The Washington Times	the FEDERALIST
THE NEW YORKER	POLITICO	THE WALL STREET news JOURNAL		NATIONAL REVIEW
The New York Times opinion	ProPublica			NEW YORK POST opinion
The Nation.	TIME			NEWSMAX
SLATE	The Washington Post			The WASHINGTON FREE BEACON
Vox	USA TODAY			OAN One America News Network
	yahoo! news			

L LEFT   L LEAN LEFT   C CENTER   R LEAN RIGHT   R RIGHT

AllSides Media Bias Ratings™ are based on multi-partisan, scientific analysis.
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Version 7 | AllSides 2022

Major Takeaways

Teach how to notice information pollution every day in all life circumstances, and every class at every grade level

Teach a user's manual for the mind and all its faults and how to control for these

Teach in the context of units and lessons you already teach – or in the context of life situations that come up

Teach through guided inquiry to teach the WHY and the HOW, and connect learners' lived experience to curricular content

Teach source and evidence evaluation – in all that we do . . .

Choose One Prompt …

1. One strategy I could use in a specific lesson or unit is _____.

2. A way that I could invite students to self-assess would be _____.

3. I am now committed to rethink or recommit to _____ (e.g. beliefs, actions, systems, materials …) because _____.

Type "takeaways" into chat box
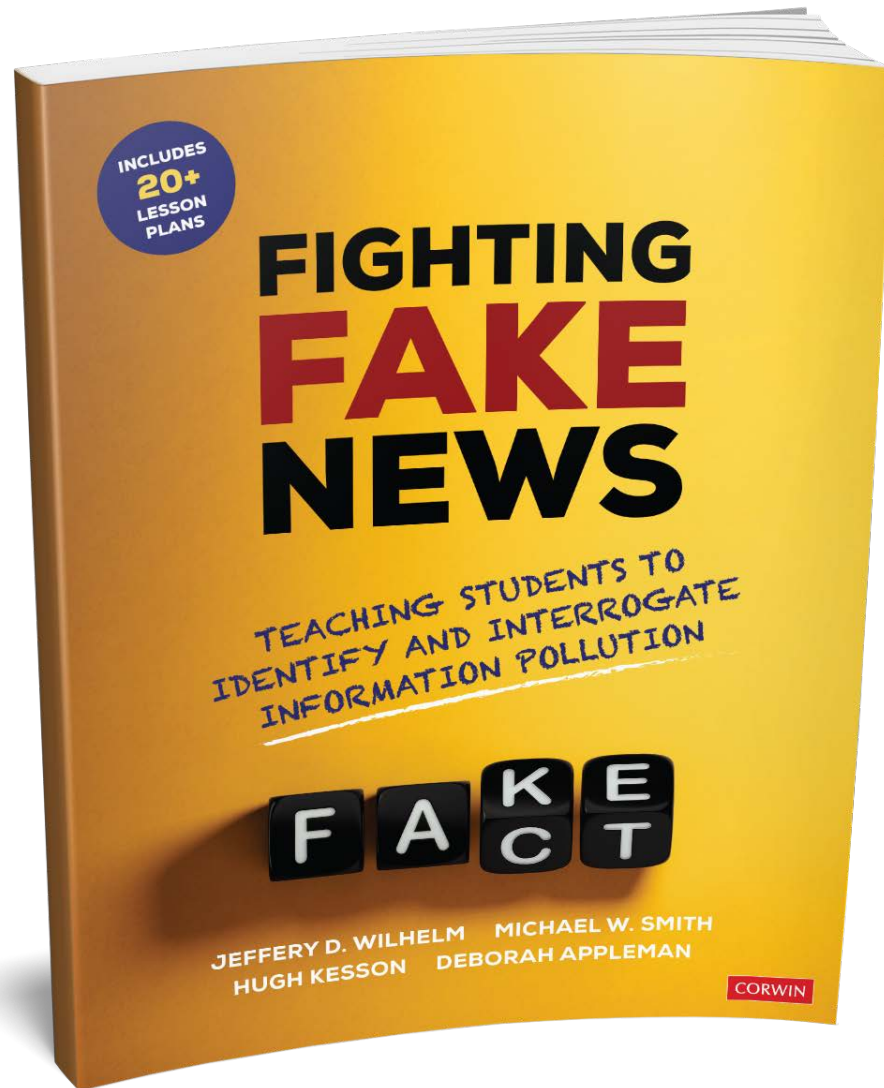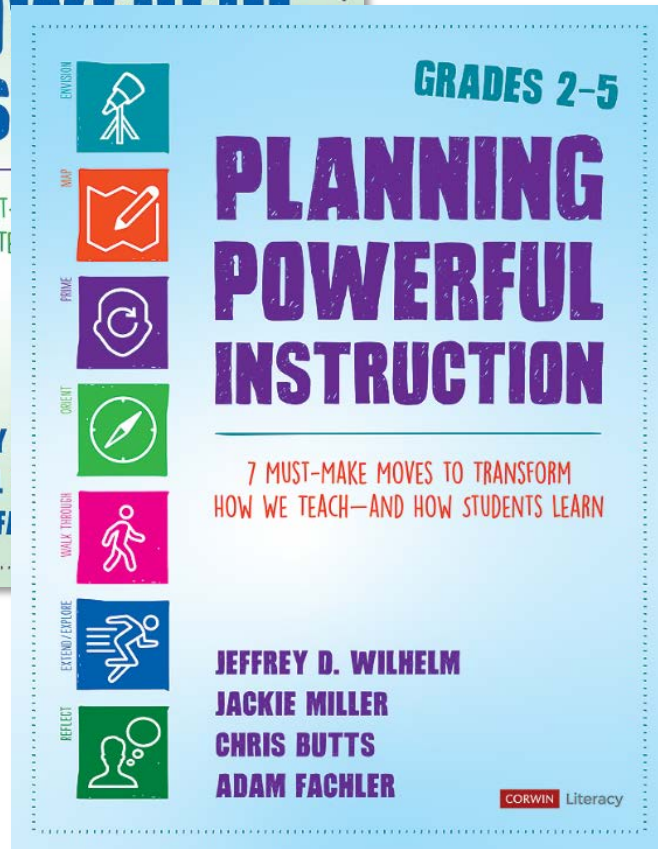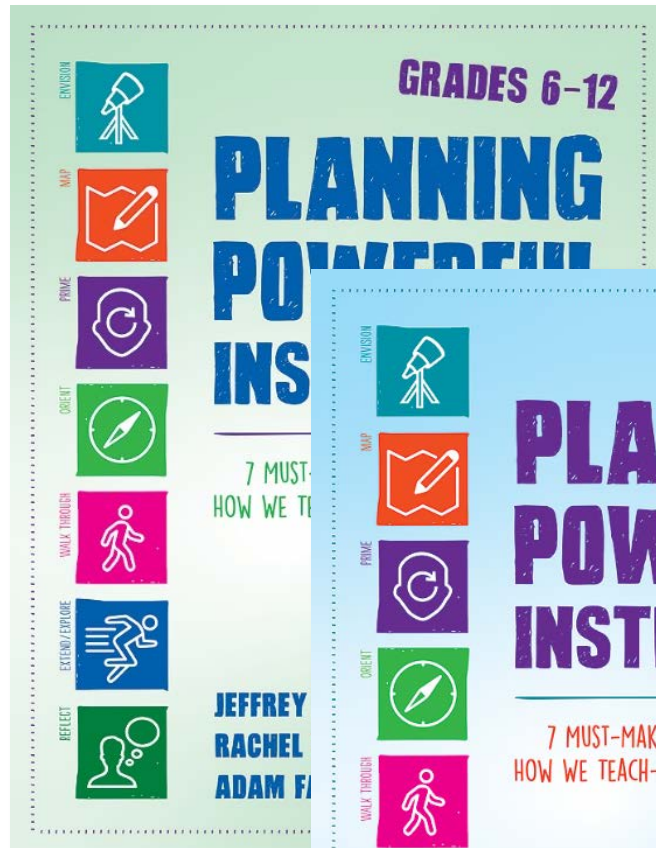
Planning Powerful Instruction

7 Must-Make Moves to Transform How We Teach--and How Students Learn

Jeffrey D. Wilhelm, Jackie Miller, Chris Butts, Adam Fachler, Rachel Bear

Your go-to guides for transforming student outcomes through stellar instructional planning. The 7-step framework—**the EMPOWER model**—gives you techniques proven to help students develop true insight and understanding.

CORWIN Literacy