

Critical Thinking In A World Of Misinformation

C-100135

Why Critical Thinking Is Important?



The Great Sparrow Campaign 1958



“All must join the battle... We must persevere with the doggedness of revolutionaries!”



Why Critical Thinking Is Important?



The Great Chinese Famine 1959-1961 - claimed between 15 and 45 million lives

Why Critical Thinking Is Important?

- **Failure of thought**
- **Lack of reflection**
- **Failure to think about consequences**

**“Something must be done; this is something;
therefore this must be done”**

Why Critical Thinking Is Important?



- Reason
- Reflect
- Infer

Misinformation In Healthcare

“Falsehoods have been shown to spread faster and farther than accurate information 1 and research suggests that misinformation can have negative effects in the real world, such as amplifying controversy about vaccines 2 and propagating unproven cancer treatments.3 Health misinformation on social media, therefore, urgently requires greater action from those working in public health research and practice.”

1. The spread of true and false news online. *Vosoughi S, Roy D, Aral S, Science. 2018 Mar 9; 359(6380):1146-1151.*
2. Weaponized Health Communication: Twitter Bots and Russian Trolls Amplify the Vaccine Debate. *Broniatowski DA, Jamison AM, Qi S, AlKulaib L, Chen T, Benton A, Quinn SC, Dredze M, Am J Public Health. 2018 Oct; 108(10):1378-1384.*
3. Is Cancer Information Exchanged on Social Media Scientifically Accurate? *Gage-Bouchard EA, LaValley S, Warunek M, Beaupin LK, Mollica M, J Cancer Educ. 2018 Dec; 33(6):1328-1332.*

What challenges does this pose to us in practice?

Discussion Points:

- **How do we communicate with our patients who are victims of false information?**
- **Why do people fall victim to misinformation?**
- **Can you think of an example of false information commonly misunderstood in eye care?**

How do we communicate with patients who are victims of misinformation & why do they fall victim to misinformation?

- Psychological factors, including emotions and cognitive biases, may render straightforward efforts to counter misinformation by providing accurate information ineffective.
- Interventions, such as recommending articles with corrective information, have shown mixed efficacy.
- The human tendency toward confirmation bias may render debunking efforts ineffective, as corrective information may be viewed as inconsistent with a preferred narrative and therefore ignored or denied.
- In situations in which a strong confirmation bias exists, interventions based on value affirmation might be more effective.

The Social Media Echo Chamber - Confirmation Bias

“Social media plays a notable role in reaching broad audiences and facilitating online interactions such as healthcare campaign promotions and health information dissemination 1”

Confirmation bias, the tendency to process information by looking for, or interpreting, information that is consistent with one's existing beliefs. This biased approach to decision making is largely unintentional and often results in ignoring inconsistent information.



1. J. Shi, T. Poorisat, C.T. Salmon, The use of social networking sites (SNSs) in health communication campaigns: Review and recommendations, Health Communication, 33 (1) (2018), pp. 49-56,

What impact does misinformation & distrust in medical advice have in optometric practice?

Discussion Points:

- **What impact does misinformation have in optometric practice?**
- **Why is there distrust in medical professionals?**

Distrust In The Medical Profession

“The problem is that public perception of sight tests and the role of optometrists in delivering primary eyecare is variable. Poorer and less well educated people are much less likely to seek regular eye examinations. This is because of concern about the cost of spectacles which are set high in order to sustain the viability of optometric practice. This has the potential to engender a level of distrust between the profession and their clients. (Cross et al, 2007)”



House of Commons
Health Committee

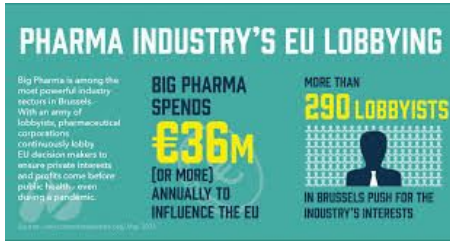
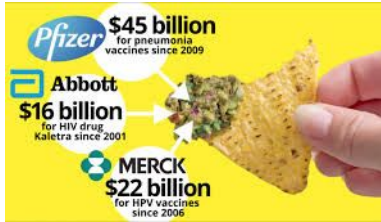
Health Inequalities

Written evidence

Session 2007–08

Volume II

Distrust In The Medical Profession

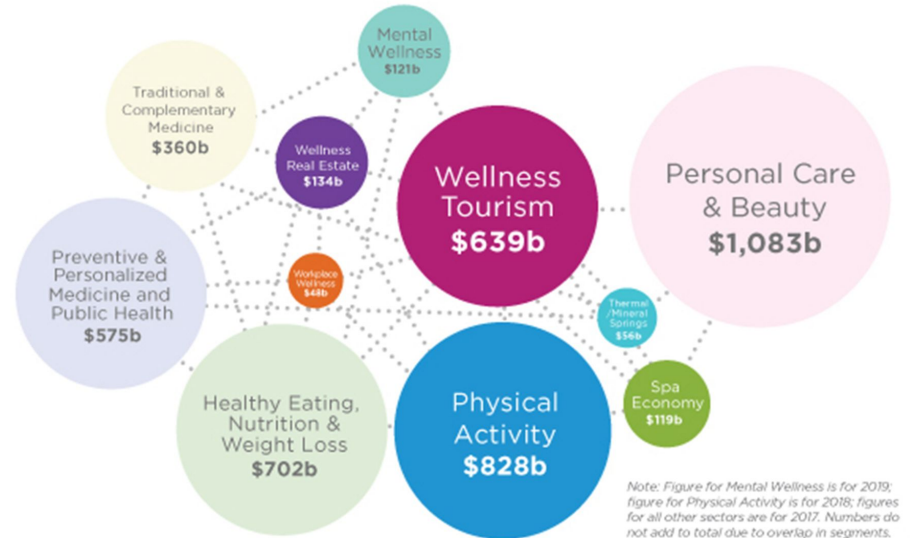


Distrust In The Medical Profession

Wellness Industry:

- Unregulated
- Relies predominantly on anecdotal “evidence”
- No protected titles
- No governing bodies to ensure standards
- Often uses ambiguous terms such as “natural” to imply a product is safer or healthier

GLOBAL WELLNESS ECONOMY: \$4.5 Trillion Market



Note: Figure for Mental Wellness is for 2019; figure for Physical Activity is for 2018; figures for all other sectors are for 2017. Numbers do not add to total due to overlap in segments. Dark colored bubbles are the sectors for which GWI conducts in-depth, country-level primary research. Light colored bubbles are sectors for which GWI aggregates global estimates only, drawing from secondary sources.

Distrust In The Medical Profession

“Distinguishing between disinformation and inequality driven mistrust and shifting language away from “conspiracy beliefs” can help avoid pushing people further toward endorsing misinformation and disinformation. 1”

1. Disinformation, Misinformation and Inequality-Driven Mistrust in the Time of COVID-19: Lessons Unlearned from AIDS Denialism J. Jaiswal^{1,2,3,5} · C. LoSchiavo³ · D. C. Perlman^{4,5} Published online: 21 May 2020 © Springer Science+Business Media, LLC, part of Springer Nature 2020

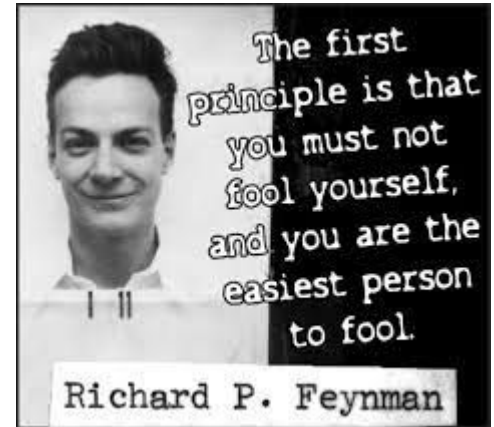
How do we identify misinformation?

Discussion Point:

- **How do you identify false information?**
- **What are the tell tale signs that healthcare information is false?**

Science Vs Pseudoscience

“In the South Seas there is a cargo cult of people. During the war they saw airplanes land with lots of good materials, and they want the same thing to happen now. So they've arranged to imitate things like runways, to put fires along the sides of the runways, to make a wooden hut for a man to sit in, with two wooden pieces on his head like headphones and bars of bamboo sticking out like antennas – he's the controller – and they wait for the airplanes to land. They're doing everything right. The form is perfect. It looks exactly the way it looked before. But it doesn't work. No airplanes land. So I call these things cargo cult science, because they follow all the apparent precepts and forms of scientific investigation, but they're missing something essential, because the planes don't land.”



Science Vs Pseudoscience

Quality Of Evidence

- **Underpinned by supporting data**
- **Clear description of methodology**
- **Claims that rely largely on anecdotal or testimonial evidence should be considered suspect.**

Authority

- **Scientific claims don't derive authority by virtue of coming from scientists**
- **Acceptance stems from the weight of evidence behind it**
- **Pseudoscientific claims often focus around ostensible experts or gurus rather than evidence**

Science Vs Pseudoscience

“The term non sequitur refers to a conclusion that isn't aligned with previous statements or evidence”

Logic

- **Every link in the argument must connect, not just a few**
- **Non sequiturs suggest dubious conclusions**
- **Overly reductive claims that suggest single causes or cures for complex situations or conditions should be treated sceptically**

Testable Claims

- **Falsifiability is paramount to gauging the validity of a claim**
- **If it cannot be proven wrong, it is not scientific**
- **That which cannot be verified by independent investigation is likely to be pseudoscience**

Science Vs Pseudoscience

Totally Of Evidence

- **The hypothesis must consider all of the evidence & not just cherry pick collaborating evidence**
- **If the claim is consistent with & compatible with all evidence it is usually reasonable to accept it**
- **If it clashes with the weight of previous data then testable reasons must be suggested**

Occams Razor

- **Does the claim rely on a multitude of supplementary assertions?**
- **If an alternative hypothesis better explains the available data, strong evidence would have to be provided to justify additional assumptions**

Occams Razor

“pluralitas non est ponenda sine necessitate”

“plurality should not be posited without necessity.”



Principle of Parsimony

The principle of parsimony recommends that from among theories fitting the data equally well, scientists choose the simplest theory. Thus, the fit of the data is not the only criterion bearing on theory choice.

Science Vs Pseudoscience

Burden Of Proof

- The onus is **ALWAYS** on those making the claim to support it with evidence, rather than for others to disprove it.
- Attempts to shift the burden of proof are a warning sign of bad science.
- Claims that pivot on special pleading to justify a lack of evidence (including conspiracy theories) are hallmarks of pseudoscience.

Claims made in the spirit of enquiry are more likely to be scientific than those made in the spirit of justification.

Science Vs Pseudoscience

**Burden Of Proof
means thats...**

