

Viewpoint

# Healing Anthropocene Syndrome: Planetary Health Requires Remediation of the Toxic Post-Truth Environment

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**Abstract:** The term “Anthropocene Syndrome” describes the wicked interrelated challenges of our time. These include, but are not limited to, unacceptable poverty (of both income and opportunity), grotesque biodiversity losses, climate change, environmental degradation, resource depletion, the global burden of non-communicable diseases (NCDs), health inequalities, social injustices, the spread of ultra-processed foods, consumerism and incivility in tandem with a diminished emphasis on the greater potential of humankind, efforts toward unity, or the value of fulfilment and flourishing of all humankind. Planetary health is a concept that recognizes the interdependent vitality of all natural and anthropogenic ecosystems—social, political and otherwise; it blurs the artificial lines between health at scales of person, place and planet. Promoting planetary health requires addressing the underlying pathology of “Anthropocene Syndrome” and the deeper value systems and power dynamics that promote its various signs and symptoms. Here, we focus on misinformation as a toxin that maintains the syndromic status quo—rapid dissemination of falsehoods and dark conspiracies on social media, fake news, alternative facts and medical misinformation described by the World Health Organization as an “infodemic”. In the context of planetary health, we explore the historical antecedents of this “infodemic” and underscore an urgent need to remediate the misinformation mess. It is our contention that education (especially in early life) emphasizing mindfulness and understanding of the mechanisms by which propaganda is spread (and unhealthy products are marketed) is essential. We expand the discourse on positive social contagion and argue that empowerment through education can help lead to an information transformation with the aim of flourishing along every link in the person, place and planet continuum.



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**Keywords:** planetary health; Anthropocene; post-truth; truth; misinformation; disinformation; propaganda; COVID-19; unity; health equity; social justice; environmental justice; consumerism; ultra-processed foods; NCDs (non-communicable disease); DOHaD (developmental origins of health and disease); cross-sectoral initiatives; Anthropocene Syndrome; network multipliers; mindfulness

## 1. Introduction

Planetary health is defined as the interdependent sustainable vitality of all natural and anthropogenic ecosystems. In this context, the many signs and symptoms of planetary ill-health and “dis-ease” can be captured under the umbrella of “Anthropocene Syndrome”. These include, but are not limited to, unfathomable biodiversity losses, climate change, social injustices, environmental degradation, resource depletion, the global burden of non-communicable diseases (NCDs), health and income inequalities, the spread of ultra-processed foods, consumerism, polarization and incivility in tandem with a diminished emphasis on the unity of all humankind. While there has been much celebration of

improvements in “extreme” poverty (living on less than \$2 per day), over 70% of the world’s population lives on less than \$10 dollars per day, and, as such, we can note that poverty based on that figure has been expanding across the world, not contracting [1,2].

While planetary health as a multidisciplinary effort often confines itself to examining physical toxins in our environment—airborne particulate matter or waterborne contaminants, for example—it is our contention that Anthropocene Syndrome is also marked by “toxins” that are also harmful (if not lethal) to health at all scales. The toxins we refer to are widely distributed pieces of misinformation. Here in this Viewpoint, we argue that addressing the *Syndrome* and promoting planetary health requires a deeper analysis of our post-truth era, and an understanding of the ways in which the human vulnerability to misinformation (and disinformation and propaganda) can promote divisiveness, maintain the status quo and compromise planetary health.

At the same time, lessons learned from the rapidly expanding research on misinformation may provide valuable insights in the context of positive social contagion; specifically, the aims of misinformation remediation should go beyond toxic cleanup and point toward a greater understanding of the ways in which positive social contagion (the spread of health-promoting information) might be enhanced. At the outset we underscore that most of the literature on misinformation has emerged from and pertains to affluent westernized nations, although emerging research highlights that the spread of misinformation is potentially no less threatening to the health of persons in the Global South [3–7]. Moreover, the rapid spread of unhealthy products (e.g., low-cost ultra-processed foods [8]) to the Global South [9], aided and abetted by manipulative techniques (political, marketing and otherwise) described below, directly compromises health and obscures the upstream social, commercial and ecological determinants of health [10]. The burden of greed, materialism and consumption of the Global North has been foisted on to the Global South [11,12]—facilitated and maintained in part by marketing and propaganda as described below.

In our Viewpoint we provide historical context to what the World Health Organization now refers to as an “infodemic”—a global crisis of “contagious” misinformation; we attempt to bring this discourse upstream; in the context of planetary health, the current coronavirus pandemic (described colloquially as COVID-19) is unmasking the seriousness of a pre-existing pandemic of NCDs, and forcing society to more closely examine the “causes of the causes” (in ecological terms, the “houses of the houses”) that drive risk of COVID-19 severity/hospitalization/mortality in disproportional ways; that is, mounting evidence shows that COVID-19 severity and mortality is shouldered by the disadvantaged [13], the very individuals and groups that carry the disproportional burden of NCDs [14]. Unhealthy “lifestyle” factors have been estimated to account for significant risk of COVID-19 hospitalization [15]. Yet, articles on lifestyle medicine vis à vis COVID-19 elide the words “disadvantage”, “deprivation” or even “socioeconomic” [16] and the extent to which the massive, multinational marketing of unhealthy products (and lifestyle) push against disadvantaged individuals and communities in a disproportionate way [17]; prior to the COVID-19 pandemic, it was already known that >60% of premature deaths can be potentially prevented by adherence to healthy lifestyle [18], while the WHO emphasized that NCDs accounted for 71% of all global deaths, and 85% of the 15 million premature deaths (deaths between ages 30 and 70) occurred in low- and middle-income countries [19]. Poverty may be a central factor in driving premature death, yet research on anti-poverty interventions and NCDs are scarce; moreover, some poverty reduction interventions, such as increasing access to “affordable” food, appears to *increase* NCD risk due to increased consumption of high-calorie, nutrient-poor foods [20].

Thus, while it is essential to understand and address the acute crisis of misinformation as it relates to the COVID-19 pandemic (or even the most obvious aspects of planetary health—e.g., climate-change denial), we must examine poverty (calling it by its real name, and not the ideological income-based red-line definitions of “extreme poverty” that paint rosy pictures for “progress” and the status quo [21]) and the upstream drivers of NCD risk; it is our contention that by doing so, especially through policy changes and education,

particularly in early life, we can address the mediators that ultimately filter into the realm of the current infectious disease pandemic, as well as the misinformation mess, in general [22]. We highlight the potential value of mindfulness at all ages.

At the outset it is worth defining so-called “questionable” information. Dictionaries have defined misinformation simply as “wrong information or false accounts”; disinformation is a word drawn from 20th century military and intelligence parlance, and is now taken to mean information propagated “with intent to mislead”. The term “propaganda” derives from the Latin *propago* used to describe plant shoots used for replication and growth. Propagandism was defined in 1800s dictionaries as “zealous dissemination of doctrines” [23]; in 1939 a panel of experts defined propaganda as “expression of opinions or action by individuals or groups deliberately designed to influence opinions or actions of other individuals or groups with reference to predetermined ends”—with the process reliant upon untruthfulness, misleading information and quite often, the camouflage of “front” groups and other forms of concealment that obscure its instigator(s) (Figure 1) [24].



**Figure 1.** “Infodemic” of propaganda and misinformation: Vested interests manufacture need, fear and/or polarization, to distract, manipulate and maintain the erosive status quo that serves their agenda—especially by social media channels. Artwork by SLP.

## 2. The Term Post-Truth

Falsehoods, propaganda and lies have been traded in the public sphere since time immemorial; in the early 16th century, Niccolò Machiavelli wrote that “*we see from what has taken place in our own days that princes who have set little store by their word, but have known how to overreach men by their cunning, have accomplished great things, and in the end got the better of those who trusted in honest dealing*” Niccolò Machiavelli [25]; breaking down Machiavelli’s quote for the 21st century, “great things” can obviously be taken to mean things that are horrendous for the welfare of certain groups, if not all life on Earth (Figure 2). What has changed, seemingly, is the ease and extent to which “overreach by cunning” permeates current discourse, and the ways in which instant telecommunications and insidious showbiz media pacifies the mind into apathy concerning the essentiality of “honest dealing” [26].

The word post-truth was popularized by author Steve Tisich who focused on the ways in which American society was, increasingly, avoiding hard truths. In 1992, Tisich argued that since hard truths—corruption at the highest levels of government, for example—are associated with collective discomfort, a soothing balm was to be found in simply accepting alternate communication. Specifically, it means accepting messages, no matter how false, that suggest hard truths either do not exist or are of little relevance to daily life. Tisich wrote

that, increasingly, “we would see only what our government wanted us to see, and we saw nothing wrong with that”. He set forth the implications in dire terms: “We are rapidly becoming prototypes of a people that totalitarian monsters could only drool about in their dreams. All the dictators up to now have had to work hard at suppressing the truth. We, by our actions, are saying that this is no longer necessary, that we have acquired a spiritual mechanism that can denude truth of any significance. In a very fundamental way we, as a free people, have freely decided that we want to live in some post-truth world” [27].



**Figure 2.** Engineering the “truth” for the masses is not new, but the power to do so has never been greater. Artwork by Susan L. Prescott (SLP).

In his 2004 book, *Post-Truth*, author Ralph Keyes described a new era in which facts and reality are perceived: “Deception has become the modern way of life. Where once the boundary line between truth and lies was clear and distinct, it is no longer so. In the post-truth era, deceiving others has become a challenge, a game, a habit”. Moreover, Keyes argued that the post-truth era is characterized by “a third category of ambiguous statements that are not exactly the truth but fall just short of a lie. Enhanced truth it might be called. Neo-truth. Soft truth. Faux truth. Truth lite” [28].

By 2016, Oxford Dictionaries settled on “post-truth” as its “Word of the Year”. The formal definition of the word included “circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief” [29]. Writing in *Nature*, professor of philosophy Kathleen Higgins wrote that “post-truth refers to blatant lies being routine across society”, and that “public tolerance of inaccurate and undefended allegations, non sequiturs in response to hard questions and outright denials of facts is shockingly high” [30]. While post-truth and the crisis of misinformation is widely discussed in academia [31–33] its relevance to planetary health often escapes discourse [34]. Moreover, there is a tendency to consider the post-truth crisis ahistorically, or as a phenomenon exclusively associated with recent political campaigns. Attention to the early origins of the post-truth era—or how we got to here—would seem a necessary prerequisite for solutions-oriented thinking. As argued here, conversations about leaving the Anthropocene and the post-truth era are one-in-the-same.

### 3. Developmental Origins of the Post-Truth Era (DOPE)

*“Public credulity seems to be the mark of our age. We’re ready to swallow anything shown on television, whether it has any basis in fact or not . . . when people are searching for a name for the age we live in, they sometimes call it the Age of Anxiety. How about . . . the Age of Fraudulence?”*

Barbara W. Tuchman, 1988 [35].

It is hard to pinpoint an exact time at which the cultural apathy for truth, as described by Tisich and Keyes, actually began. As early as 1925, *Harper's Magazine* forewarned, by name, a crisis of "Fake News" that could be facilitated by the "rapidly increased efficiency of the distributing mechanism . . . [coincident with] the number of people—a number far greater than most readers realize—who are intent on misinforming the public for their own ends" [36]; in a separate *Harper's* article the same year (1925), entitled *Sell the Papers!* it was noted that the opinion/editorial pages of print media often spread profit-generating propaganda that simply confirmed the preexisting biases of readership and reinforced the herd mentality (via a "conscious effort to bootlick public sentiment instead of to inform and lead it"); moreover, the piece argued that newspapers were too dependent upon advertising revenue and sensationalism as a sales tool [37].

However, the "strata" marker of the post-truth epoch is the point at which large scale indifference to facts has set in. Moreover, to that, certain clues point to the mid-1970s, in the aftermath of Vietnam, Watergate and Moon landings; in a review of artist Andy Warhol's book (*From A to B and Back Again*. Harcourt Brace. 1975), *New York Times* critic Barbara Goldsmith portended the post-truth era: *What is image and what is real? Can we answer? I remember reading somewhere that almost half of the people polled after a 1972 moon walk did not believe in the man on the moon. They thought they were watching a "television simulation". We have seen too many simulations, and the emotional signposts that once marked the road to truth have been obliterated* [38]. Goldsmith identified the power of image as a primary culprit in our inability to stand at the Y-junction and, at the very least, know which road leads toward truth.

This time period also marked the beginning of the decline in trust of news media outlets [39] and a rise in polarity among followers of Republican and Democrat parties [40]. Today, political polarization in the United States is at the extreme [41] and as of 2019, only 13% of Americans have a "great deal" of trust in the mass media [42].

Thus, drilling down to the roots of post-truth takes us to "image"—which is to say, marketing and "public relations". The mid-century/modern "hidden persuaders" of North American marketing firms were so successful at manufacturing image and illusion—mostly to sell product or propaganda—that scholar Daniel J. Boorstin described 1960s' Americans as the most illusion-filled people on Earth. As he said, the first people in history to have been able to make their illusions so vivid, so persuasive, so "realistic" that they can live in them [43]. The ability to alter image, especially with expanding media choices (Figure 3) in tandem with fruits of marketing science—that is, leveraging human vulnerability to suspension of disbelief—was obscuring the emotional signposts to truth, as described by Goldsmith.

Separating illusion from reality is tiresome and cognitively taxing, and, at larger scales, apathy should be at least one expected outcome [44]. Consider the words of Nobel prize winning author Czeslaw Milosz in his 1980 Nobel acceptance speech. Milosz stated that the era (at that time) was characterized not only with credulity and apathy, but an outright "refusal to remember": *"Our planet that gets smaller every year, with its fantastic proliferation of mass media, is witnessing a process that escapes definition, characterized by a refusal to remember . . . we are surrounded today by fictions about the past, contrary to common sense, and to an elementary perception of good and evil"*, said Milosz, empathizing for the person who might worry about a "not distant future, when history will be reduced to what appears on television, while the truth, because it is too complicated, will be buried in the archives, if not totally annihilated" [45].

In 1983, an article in *The New York Times* expressed concern about national apathy for truth. Specifically, the article was addressing a variety of falsehoods that seemed to be emerging from the White House at the time. Reagan staffers seemed increasingly unconcerned with potential misinformation, perhaps, the *Times* argued, because they realized there would be little subsequent scrutiny; segments of media appeared to be paying less attention to falsehoods, mirroring a "decline in interest by the general public" [46]. As witnessed from the quote above, two-time Pulitzer Prize winner Barbara W. Tuchman was already

describing the 1980s as a time of public credulity—in her words, the Age of Fraudulence. Indeed, although so-called “fake news” is often viewed as a new phenomenon, it is worth pointing out that, in the mid-1980s, the *Weekly World News*, a tabloid with headlines such as “WW2 Bomber Found on Moon”, enjoyed a circulation of over one million. Moreover, the overall circulation of its competitors, the sensational “news” genera, was in the range of 11 million [47].



**Figure 3.** Algorithms “behind the curtain” of awareness: “Personalized” information, misinformation and disinformation engineered to reinforce biases, encourage consumerism and desire for unhealthy products, and obscure the power dynamics that sit behind the orchestrated illusions. Artwork by SLP.

In 1985, Professor Neil Postman published his the highly acclaimed book, *Amusing Ourselves to Death: Public Discourse in the Age of Show Business* (Viking Penguin, 1985); he argued that modern societies—so deeply rooted in screen-based information consumption and the increasing need to be amused in all critical aspects of social discourse, political, academic and otherwise—should be concerned about the emerging apathy for truth. Television and marketing were combining, Postman argued, to transform otherwise serious public discourse into entertainment; showbiz had infiltrated our most trusted institutions, leading to an environment which resembles Aldous Huxley’s *Brave New World*; that is, a place where, as Postman wrote, “truth would be drowned in a sea of irrelevance”. Postman warned that Huxley was “trying to tell us that what afflicted the people in *Brave New World* was not that they were laughing instead of thinking, but that they did not know what they were laughing about and why they had stopped thinking” [26].

Remarkably, Postman’s book was published at the dawn of the post-truth era, and its lessons—largely drawn from television, radio and print media—are all the more relevant with the advent of the internet, smartphones and so-called “social” media. Postman focused on the way in which the permeation of show business into the policy-making arena and public institutions was mediated by rapid 3.5 s screen-based visuals. This, he argued, diminished reflective thinking, and, by default, various professionals were more concerned with their visual image than the deeper layers of vital discourse; moreover, the fragmented images of showbiz were diminishing the viewers ability to see the interconnectivity of events and systems [48]. This is especially troublesome from a planetary health perspective, which attempts to underscore the causes of the causes and the ways in which various factors, including those may at first glance seem unrelated, are indeed deeply intertwined [49].

It is clear that by the late 1980s, multiple experts in academia, literature and trustworthy media were ringing alarm bells concerning the power of image, national credulity and the coincident large-scale apathy for truth. This era witnessed the growth of indus-

try front groups that leverage very selective scientific findings to support the unhealthy products industry—tobacco, alcohol, fast food, ultra-processed food soft-drinks and unsafe products—while dressed up in the tapestry of trust [50,51]. Combined with increasing polarization in politics and other matters of high-level social discourse, this set the table for Web 2.0 and its ability not only to draw together otherwise isolated groups (e.g., those who deny the sphericity of the Earth, or conspiracy theorists), but to amplify misinformation to once unimaginable scales [52].

The scientific community was slow to investigate the changing cultural winds and the potential downside of internet platforms, or what we now refer to as an “infodemic”. Mostly the research focused on the slippery term internet addiction [53] or the mental health consequences of excess screen time [54]; that changed with the 2016 US election and UK Brexit referendum, along with the recent coronavirus pandemic. Searching the keyword “misinformation” (or others such as “falsehoods”, “liars”, “myths” or “conspiracy”) on the PubMed database returns results that are highly clustered in recent years—the bulk have been published between 2015 and now. Even searching the word “truth” brings more results published post-2015 than the three decades of 1970 to 2000!

Still, the study of objective truth—the ways in which we construct truth judgments and separate true and false information—was certainly not ignored. Long before the rise of the internet and social media, experts in cognitive and social psychology built a platform of evidence that is highly relevant to the current misinformation mess [55]. Research dating back to the 1970s has shown that the repetition of claims increases the likelihood that they will be deemed true [56]; this phenomenon is termed “illusory truth”.

Researchers also reported, decades ago, that distractions increase the likelihood that false information will be recalled as true [57,58]; since media multitasking and distraction may be a marker of our era [59–61], the implications are obvious. Similarly, in the context of information processing for decision making, distractions lead to falsehoods being included in the decision as if they were factual—including decisions of immense importance. In an experimental study, subjects recommended prison sentences based on reading black ink crime reports embedded with identifiable falsehoods (subjects were told that information in red ink, e.g., “robber had a gun”, was erroneously mixed in from another unrelated case and should be discounted). Distracted subjects recommended that “perpetrators” serve nearly twice as much time when relying on crime-exacerbating information they should have ignored [62]. Such research should not be surprising when viewed in the context of the large body of literature on resource depletion and self-control, wherein repeated acts of inhibiting or “dampening” external/irrelevant information while fixing attention leads to exertion fatigue akin to muscular exertion—logical reasoning and extrapolation abilities diminish when individuals are depleted [63].

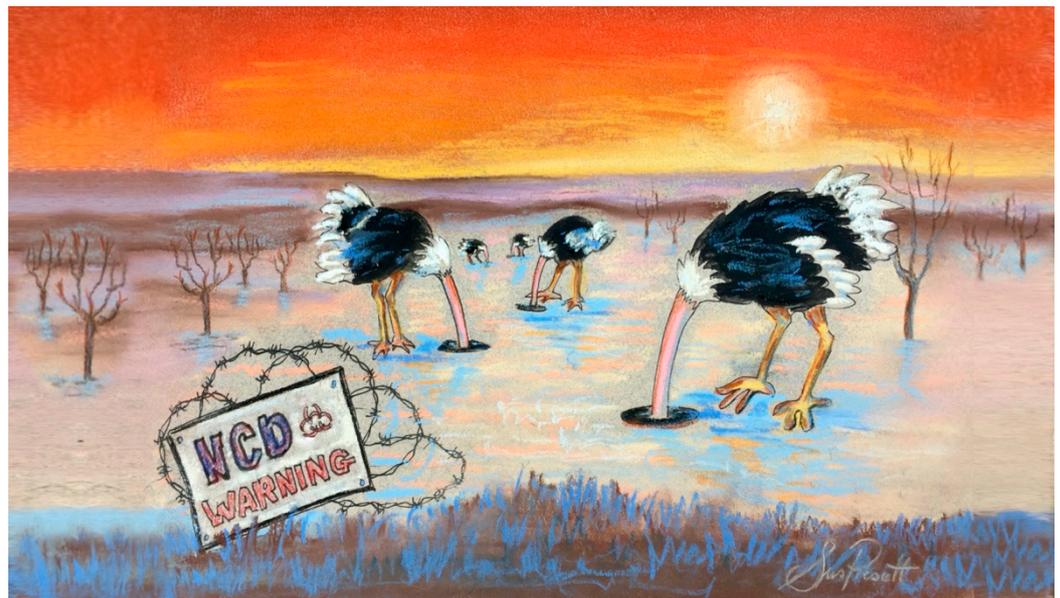
It is worth pointing out at this juncture that repetition and interruption have been the historical nucleus of westernized marketing techniques [64]. The value of illusory truth and distraction has not been lost on the marketing machines that broker materialistic behaviors, in general, and increase the sales of unhealthy products, in particular [65–70].

The spread of disinformation, misinformation and propaganda is of enormous consequence to health at all scales [52]; this can range from dark conspiracies related to the coronavirus pandemic and falsehoods that otherwise propagate anti-vaccine rhetoric, to that which supports climate change denial and status-quo policies that otherwise maintain inequalities corrosive to health [71,72]; once in place, misinformation is difficult to eradicate, and even when an individual is provided with corrected information, the original misinformation has an enduring influence on the maintenance of falsehoods [73–75]. Although physicians, scientists and experts still generally enjoy very high levels of trust in the modern era, there is an undeniably potent amount of anti-science and anti-expert rhetoric in westernized nations. The misinformation crisis undermines the ability of individuals and societies to make informed choices, including those that have long-lasting consequences to well-being at all scales [76,77].

*“Post-truth is pre-fascism...when we give up on truth, we concede power to those with the wealth and charisma to create spectacle in its place...if we lose the institutions that produce facts that are pertinent to us, then we tend to wallow in attractive abstractions and fictions. Truth defends itself particularly poorly when there is not very much of it around: [Social media] supercharges the mental habits by which we seek emotional stimulation and comfort, which means losing the distinction between what feels true and what actually is true”*

wrote Professor Timothy Snyder, recently, in the *New York Times*, on the social climate of 2021 [78].

In sum, while the spread of propaganda, misinformation and disinformation is certainly not a new phenomenon, the term post-truth era emphasizes the sheer scale and rapidity with which falsehoods and dark conspiracies can and do travel within our modern, interconnected world. The trading and dealing of falsehoods—indeed, quite often the wellsprings of misinformation are monetized or support financially rooted agendas—does not take place in a vacuum. Misinformation circumnavigates an ailing planet, with potentially dire implications to individuals and communities, especially the already vulnerable and disadvantaged. Many forms of misinformation threaten health at scales of person, place and planet, and, at the same time, hold in place the very power dynamics and value systems that underlie Anthropocene Syndrome (Figure 4). Perhaps it is worth imagining pieces of misinformation as toxic units—airborne particulate matter, heavy metals, dioxins, etc.—as a way to underscore the crisis of post-truth and the need to consider it a primary problem which must be addressed within the construct of planetary health.



**Figure 4.** The COVID19 pandemic is unmasking the seriousness of a pre-existing pandemic of non-communicable diseases (NCDs) that has been ignored for so long. Artwork by SLP.

#### 4. Contagion of Misinformation

Recent evidence indicates that news articles deemed false (so-called “fake news”) are disseminated more broadly and at greater speed than are news articles anchored in facts and evidence [79]. Moreover, false news stories have been shown to garnish more “engagement” (e.g., likes, shares and comments) than top news stories rooted in facts [80] (Figure 5). On the literal aspects of “image”, contemporary research shows that the mere display of photographs in the vicinity of claims makes them more believable and more likely to be shared [81,82]. For example, if a generic photograph of a giraffe is displayed alongside the claim “giraffes are the only mammals that can’t jump”, respondents are more likely to deem the claim to be true [83]. In the meantime, traditional journalists are grappling with the rise

of technology platforms (e.g., Twitter and Facebook) that have “disrupted” their profession (that is, diverted their readership and threatened economic sustainability) and incentivized so-called clickbait—sensational headlines designed to entice readers, often at odds with factual content within the article text [84,85]—there seems an urgent need to examine misinformation and its appeal through the larger context of information overwhelm. Here, there may be many applicable lessons from neuropsychiatry which underscores that the human brain is a “ceaselessly information consuming organ” and that based on our evolutionary past, we may all be motivated toward clickbait in an ongoing pursuit of information we find pleasurable and rewarding [86]. Instant screen-based information is now ubiquitous, setting up the potential for an evolutionary mismatch between millennia of non-screen-based information processing and the ultra-rapid cognitive demands of ever-attractive pieces of information.



**Figure 5.** Research shows that misinformation spreads along echo-chambers within social media. Artwork by SLP.

The contemporary “information overload” may contribute to an inability to identify quality information; indeed, information overload has been associated with the spread of dubious coronavirus information [87]. Evolutionary experience has shaped the brain so as not to squander cognitive energy unnecessarily; navigating the information-heavy contemporary environment in a way that enhances identification of false stories demands reflective reasoning. Researchers have shown that individuals fall for false stories—including life-threatening misinformation concerning coronavirus—because they do not make such an investment in analytic thinking [88]; moreover, our lackadaisical cognitive approach to politically oriented false news is a much more important factor in susceptibility than personal partisan bias [89,90].

## 5. Marketing—Upstream in the Anthropocene

*“The traditional [American] method of Advertisement suggests a credulity, a love of sensation and an absence of background in the submissive, hypnotized public...but that method is now in universal use...the world in which Advertisement dwells is a one-day world. It is necessarily a plane world without depth”*

Wyndham Lewis, *Time and Western Man*. 1927 [91]

The unprecedented global spread of fast food, soft drinks and nutrient-poor, calorie-dense ultra-processed foods provides has been accomplished by a powerful marketing-industrial complex; food engineering in the Anthropocene is a three-prong approach. First, there is the engineered manipulations of sugar, fat, sodium and chemicals to enhance taste, texture and palatability. Second, cognitive engineering enhances desirability through effective marketing—advertisements, celebrity endorsements, toy giveaways, “health-halo”

label claims and vague terminology, such as “nutritious”, which collectively appeal to the mind of the parent and/or child consumer. The third form of engineering is the manipulation of the total food environment via product placement and prominent shelf-space (e.g., at visible “end-caps” at the end-of-aisle and/or center-of-aisle displays and/or point-of-purchase) devoted to ultra-processed, energy-dense, low-nutrient foods [92].

These forms of food engineering proliferate because policy (or in many cases, lack of policy through lobbying efforts) is itself engineered. In other words, the westernized nutritional environment viewed in its totality is a product of a neoliberal ideology which allow the drivers of NCDs (including ultra-processed foods) to sit on-shelf with commercially available remedies (e.g., pharmaceuticals and supplements) [51]. Under neoliberalism, personal responsibility for a healthy lifestyle is heralded to be the sole road to fulfilling potential in life (see Box 1). As discussed in the next section, the way out might be found through educational efforts directed at awareness of the ways in which the “unseen hand” rocks the cradle.

First, though, it is important to underscore that the marketing-industrial complex in the contemporary “attention economy” is more than a matter of engineering the nutritional landscape; rather, the marketing-industrial complex is at play throughout Anthropocene Syndrome, most notably as a provocateur of the unsustainable consumerism and materialism that defines Western culture. Coincident with the 1970s concern over widespread apathy for truth, scholars showed equal concern with what was described as Western culture imperialism—global spread of Western consumerism and narcissism channeled through the power of the media industrial complex and “public relations”; corroding authentic values and the social fabric, while steamrolling or appropriating local indigenous and minority cultures in its path [93–95]. Today, volumes of research shows that children are particularly vulnerable to the “branded identities” and culture of consumption shaped by marketers [96–98].

*“By using [some] accurate details to imply a misleading picture of the whole, the artful propagandist makes truth the principle form of falsehood”*

Christopher Lasch. *The Culture of Narcissism*. 1979.

The central role of materialism/consumerism in planetary ill-health was underscored in the well-publicized, if not controversial, documentary *Planet of the Humans* (Gibbs J, Moore M. Rumble Media. 2020) [99]. While the film has been labeled as propaganda in some quarters, others counter that the seemingly coordinated criticism of the film by “green” billionaires (heavily invested in the tandem of renewables, multinational brokers of unhealthy product and neoliberalism as a guiding ideology) is propaganda [100]—perfecting illustrating the times in which we live. As correctly stated by activist–scientist Vanda Shiva, in the film, *“the big crisis of our times is that our minds have been manipulated to give power to illusions. We have shifted to measuring growth, not in terms of how life is enriched, but in terms of how life is destroyed”*. The value of renewable energy to planetary health is undeniable; however, it is also undeniable that many renewable energy projects have been damaging to biodiversity, have displaced Indigenous communities, have been exploitive of the Global South and, ultimately, since they are driven by an extraction mentality, maintain status-quo power structures and grotesque inequity [101–103]. Moreover, the westernized pattern of unsustainable consumerism and materialism (prioritizing acquisition and consumption of material goods; consumption in search of happiness [104]) is a primary contributor to planetary ill-health. This unhealthy consumption pattern is aided by public relations firms that employ propaganda techniques; it is noteworthy that in the United States, these firms were first established and used by “robber barons” to deflect negative perceptions and growing unpopularity of their predatory operations [105].

*“By what right do a self-selected group of druggists, biscuit makers, and computer designers become the architects of the new world?... Marketing is now recognized as the science of needs creation”*

Scholars Richard J. Barnet and Ronald E. Muller in *Global Reach*. 1974 [93].

Materialism has been robustly associated with lower personal well-being [106,107], and, at larger scales, materialism is associated with decreased pro-environmental attitudes and behaviors [108]. Longitudinal research shows that early life experiences and exposure to advertising—middle childhood or pre-teen years in particular—may be instrumental in shaping subsequent materialism (e.g., the importance of owning expensive material items or money in general) in young adulthood [109]. Thus, although relevant at all ages, early life measures, including some discussed below, are an essential component of long-term investment in transforming planetary health for the better.

#### Box 1. Planetary Health and Neoliberalism

Planetary ill-health is in part a product of neoliberalism, a sociopolitical vantage point which obscures the influence of the total environment and magnifies the “personal responsibility” view of health and disease; at the same time, it offers an abundance of commercially available “choices”—pharmaceuticals and dietary supplements to “undo” health problems. Neoliberal ideology prioritizes short-term economic interests and drives global materialism; it simultaneously promotes weight loss shakes for lunch and high-calorie fast food for dinner; it places emphasis on possessive individualism, acquisition/materialism, competition and “ownership” into social, cultural, political and scientific arenas. In practice, neoliberalism is maintained through dynamics of power associated with affluence, militarism, social dominance orientation and coercive relations. In the process it aggravates health inequalities and acts as a threat to the well-being of all species, not only humans. Adapted from References [1,5].

## 6. Finding Solutions—Education, Empowerment

*“If you are working to improve public health and the environment, you need to know what your opponents are up to”*

Professor Rob Moodie, 2017 [110].

The World Health Organization (WHO) refers to our current situation as an “info-demic”; recently the organization underscored the urgent need for “inoculation” and “herd immunity” in the battle against misinformation [111]. Efforts to curb the rapid dissemination of misinformation are, for good reason, centered around technological fixes—for example, the use of bot detection, cigarette-package-like warning labels and algorithm adjustments [112,113]. However, the “vaccine” against potentially harmful misinformation is likely to be found in education, especially in early life (Figure 6).



**Figure 6.** Awareness is the first step toward change as individuals and as societies. Once we have awareness, we cannot go back. It allows us to see both the challenges and the possibilities and to make meaningful choices. Artwork by SLP.

Notwithstanding the rapidity of Web 2.0 and social media platforms, the mechanistic foundations by which misinformation and propaganda are spread in the current environment are fundamentally the same as they were during the lead up to, and during, World War II. At the time, Hadley Cantril, a professor of psychology at Princeton University, was instrumental in organizing the study of propaganda methods. He maintained that “education is propaganda’s most deadly enemy and is the reason why the propagandists themselves are frightened when they see people being educated in the methods that propagandists use”. He also underscored that propaganda operates along a continuum: “propagandists have sold us everything from toothpaste to war . . . [the media] depend for their very existence upon one form of propaganda which we call advertising” [114]. In 1939, faculty at the Los Angeles City College recognized “the need for instruction that will train citizens to recognize propaganda and to analyze it”; they convened experts on the topic and published materials, including the “Devices of Propaganda”, an outline of the “tricks of the trade” employed propagandists [24,115]. The seven primary devices have not aged; rather, they line up well with contemporary judgment and choice research (including Kahneman’s heuristics information processing [116,117]) and remain central to the contemporary misinformation mess:

- i. **Bandwagon:** Create the illusion that everybody—your neighbors, your fellow citizens, your colleagues and contemporaries—is agreeing with/doing/seeing/loving “it”.
- ii. **Card Stacking** (aka Cherry Picking): careful selection of the best (or the worst) facts, figures, quotations and comments while eliding those that conflict with the message or prove it to be untrue; provide letters of support, such as “Fifty leading experts have signed support...”, while, in reality, far greater numbers of more suitable experts have provided consensus on the subject.
- iii. **Glittering Generality:** the use of familiar, likeable words (referred to as “virtue words”) that key emotions—e.g., “freedom”, “justice”, “prosperity” and “heritage”.
- iv. **Name Calling:** giving something or someone a bad name (e.g., smears). The aim is to cause dislike or ridicule of the subject without depth of analysis or query.
- v. **Plain Folks:** The messenger is positioned as standing eye-to-eye with “the people” and their needs; the messenger aims to be seen as simply voicing his/her own thoughts back to them; the messenger is “one of them” and not an outsider.
- vi. **Testimonial:** direct use (or indirect via quotation) of well-known figures or a presumably trusted source to elevate the message; alternatively, use the name of, or quote a disgraced or nefarious person or outfit in a manipulative way so as to cause the reader/listener/viewer to think that *not* supporting the endgame is, by default, egregious.
- vii. **Transfer:** associate the communication with revered and trusted symbols and/or institutions in order to transfer a level of respect to the message; the symbols of science are often co-opted for this purpose.

More recently, in the *American Journal of Public Health* [110], professor Rob Moodie collated the seven primary tactics used by operatives in the unhealthy-product (tobacco, alcohol, fast food, ultra-processed foods, soft drink, etc.) industry:

- i. **Attack Legitimate Science:** To achieve this aim, many of the seven devices of propaganda are used, including cherry-picking of less reliable but conveniently conflicting research, name-calling by labeling high-quality research as “junk”, and creating uncertainty by referring to complexity of causation and funding researchers sympathetic to the corporate cause.
- ii. **Attack and Intimidate Scientists:** To achieve this aim, name-calling and smears against researchers/institutes is the primary tactic; Plain Folk is also used, as scientists are painted as out-of-touch elites; the words of Glittering Generality are used to attack evidence-based public health policies—“nanny state”, “attack on our freedoms”, etc.
- iii. **Create Arms-Length Front Organizations:** According to the 1939 definition, the heart of propaganda is often the concealed individual or group; front organizations utilize all seven of the primary propaganda devices and engage in what Moodie calls

“information laundering”; front groups often employ Transfer, effectively utilizing the trusted symbols of science. For example, the front organization, which might be financed by a soft drink lobby group, takes on the appearance of a group concerned with nutrition and produces materials that suggest junk food/drinks “are all part of a balanced diet”. Front groups also engage in “astroturfing”—well-funded “movements” that appear to be grassroots, community-driven efforts supportive of the propaganda message [118].

- iv. **Manufacture False Debate and Insist on Balance:** Divert attention away from unhealthy products by ginning up controversy and debate; focus on corporate “social responsibility” efforts—for example, promoting a community “fitness campaign” while the corporation’s primary business is serving up calorie-dense, nutrient-poor ultra-processed foods; pressure journalists to continuously provide the “other side” viewpoint, even though volumes of evidence indicate there is little in the way of debatable points.
- v. **Frame Key Issues in Highly Creative Ways:** Here the skills of propagandists are employed on a large scale; fundamentally this is diversion, a tactic that runs the gamut from using creative imagery to diminish the seriousness of health problems in question; provide an optimistic outlook that technological advances (e.g., a phone app rather than regulation or policy changes) and new product innovation will provide solutions; focus exclusively on personal responsibility.
- vi. **Fund Industry Disinformation Campaigns:** Here there is intentional introduction of falsehoods through various channels; often this activity occurs via the primary propaganda device Testimonial. Advertising abounds with compensated pitchpersons who may or not be celebrities—teeth made six shades whiter, or pillow provided the best sleep, are the more obvious variants; less obvious are compensated “expert” witnesses and “scientific” gatherings promoting a targeted, often commercial agenda [119].
- vii. **Influence the Political Agenda:** This is the arena in which propagandists often intersect; since propaganda is used within spheres of politics and product, campaign donations and heavy investments in lobbying efforts can help get a seat at the policy table with the long-game of adjusting policy, maintaining self-regulation/low oversight and crafting the messages surrounding policy efforts.

It is easy to see the overlaps between the “tricks” of propaganda and the techniques used by the unhealthy product industry. Awareness is central to progress, but how can we bolster immunity to misinformation and increase agency? Even as long ago as the 1930s, North American researchers were fascinated by the idea of strengthening the “sales resistance” of individuals against the techniques and devices of propagandists [115,120] and “immunize pupils against the effects of propaganda designed to shift their attitudes” [121]; in last several years, researchers have re-examined (based on 20th century research) specific ways to inoculate against misinformation, including educational efforts which expose the specific mechanisms by which falsehoods are brokered on the internet and through social media channels; one of those efforts is a carefully constructed game in which players learn about content designed to roil up others through invoking emotion (vs. reason), how polarization clears a path to an online presence, the ways in which floating conspiracy theories and echo chambers are constructed, the mechanisms by which discrediting opponents negates their positions, and baiting opponents through manufactured controversy. Pre and post measurements support the idea that training on the techniques (through game play) is an effective way to inoculate against subsequent confrontation with fake news and its devices [122].

One longstanding fear is that educational efforts which expose propaganda mechanisms will lead to broad cynicism; however, this has not been shown. Reassuringly, the above research also showed that teaching the “tricks” of the trade—the mechanisms of mis/disinformation spread—did not induce cynicism and heightened skepticism of generalized media [122]. Moreover, students who gain an academic appreciation for the ways

in which manipulative processes influence daily life report empowerment and strengthening beliefs in democracy and the place of science in education [123]. The point of such educational efforts is not to point out, à la carte, what is “good” or “bad” propaganda. rather, it is to invigorate individuals to make informed choices while maintaining (or even provoking) a sense of awe and wonder toward the many unsolved mysteries of the universe (see Box 2) [123].

#### Box 2. Awe, Wonder and Great Mysteries in Planetary Health

*“The blocking of one’s capacity for wonder and the loss of the capacity to appreciate mystery can have serious effects upon our psychological health, not to mention the health of our whole planet”*

Rollo May, PhD. 1992 [124]

Awe is a positive emotion that is typically provoked by grand stimuli (e.g., viewing scenes of the Earth from space, vast scenes of breathtaking nature, or childbirth can provoke awe); awe-provoking stimuli often present with an element of mystery and wonder; a scene or event that is not immediately understood [125,126]—perhaps indistinct with what philosophers refer to as the sublime (Figure 7) [127]. Awe has been connected to lower systemic inflammation, emotional well-being, increased life satisfaction, mindfulness, increased patience, decreased materialism, and pro-social and pro-environmental behaviors [128–131]. Awe enhances openness to learning, the desire to innovate and engage in creative pursuits [128]. However, the scientific study of awe (especially awe induction) has largely been confined to laboratory settings with short-term outcome measures; it has been argued that awe is much more than a “fleeting moment” emotion; rather, it has steady-state properties with much larger, transformative implications to health and vitality at scales of person, place and planet [132]. As stated by expert Kirk Schneider, *“To the extent that people are deficient in awe for life, they are much more prone to be embittered, to feel desolate or numb and to protect their hunger for spiritual connection on quick fixes, whether they be commercial products or leaders or mass movements”* [133].



**Figure 7.** Awe, wonder and mystery inspire mindfulness: Awareness of interconnectivity positively influences attitudes to ourselves, others and all things—and potentially inoculates against the spread of misinformation.

It is not designed to teach stone-like rigidity in the quest for truth; in the complex continuum between disease, basic health and optimal flourishing, open-questions are many; unwillingness to accept truths as approximations (based on the limits of certain knowledge at a given time) can manifest as authoritarianism [134].

Awareness of the mechanisms that maintain the unhealthy status quo provokes creative thinking and motivation for change [135,136]. Preliminary research shows that a 4-lesson elementary school advertising literacy module increases knowledge concerning the persuasive intent and the selling intent of marketing messages [137]. Research also shows that when young people understand the power dynamics (status and profit) that sit behind social injustices and inequalities, motivations toward healthy behavior can change; for example, compared to standard informational sessions on a dietetics pyramid or academic guidelines, teaching youth on the *ways* in which unhealthy products are foisted

on the public, especially disadvantaged communities, can lead to healthy changes in dietary patterns [138–140]. Moreover, counter-marketing strategies that trigger awareness of the power and profit dynamics of the unhealthy food industry (for example, challenging the normative industry ad-space presence at large sporting events) appear to resonate with young adults—changing attitudes toward the purveyors of unhealthy product [141]. Early educational efforts directed at the analysis of propaganda in North America (as described circa WWII) were not set up for mere debunking; the process of “immunization” involved reflective thinking, consideration of self-biases, and the total lived experiences that have shaped values and attitudes as they intersect with media messages: “it is an understanding of why and how propaganda works—how it relates to our own fears and hopes, our hates and loves, our mental and emotional conditioning, our basic needs” [123]. This is the very essence of critical thinking—the higher-order cognitive process which involves the ability to analyze and evaluate evidence and arguments without bias from experience and prior knowledge [142]. Although it was not referred to as “mindfulness” at the time, the techniques described, especially the advice to suspend reactionary judgment in the moment [115], are similar to the contemporary mindfulness practices used to reduce implicit bias [143,144]. Exposure to the techniques of propaganda was viewed as exposure to a small amount of pathogen—thus, “inoculation” [145]. While learning about techniques of propaganda may not always lead to immediate changes in pre-existing attitudes, the process does appear to inoculate against developing the attitudes which propaganda otherwise aims to foster [146].

Inoculation Theory is analogous to the biological immunization process against certain types of diseases: “In the biological situation, the person is typically made resistant to some attacking virus by pre-exposure to a weakened dose of the virus. This mild dose stimulates his defenses so that he will be better able to overcome any massive viral attack to which he is later exposed, but is not so strong that his pre-exposure will itself cause the disease” [147].

Inoculation through education and the utilization of messages that counteract the forces that compromise planetary health (and underlie Anthropocene Syndrome) are now a subject of intense scrutiny; this includes employing specific language/narrative that foils otherwise persuasive content proffered by the marketers of unhealthy commercial products [148,149], diminishes the propaganda that otherwise obfuscates the social determinants of health and suggests the NCD “pandemic” is solely a matter of personal responsibility [150], countering misinformation related to climate change [151] and anti-vaccine attitudes [152]. In addition to refining messages that resonate, the approaches of inoculation often present individuals with a weak example of misinformation along with a refutation (raising and refuting of counterarguments known as refutational pre-emption [153]); this, according to the “inoculation theory” built upon the analogy of exposure to weakened pathogens in biological vaccination [154–156], prepares individuals for subsequent exposures to more potent misinformation. Overall, this research shows tremendous promise [157,158].

As the inoculation research grows more robust, it is possible to consider the ways in which “immunization” against misinformation and propaganda might extend to “herd immunity” through the process of positive social contagion. Indeed, the possibilities go beyond curbing misinformation and consider what an information transformation might look like—with benefits that move past health per se and extend into the realm of human flourishing and the all-scales vitality that ultimately defines planetary health [159]. This potential, inspired and amplified by the awe and wonder of life itself, is described below.

## 7. Positive Social Contagion

It can be argued that many of the Anthropocene’s grand challenges are linked to the human tendency to unconsciously copy and mimic the behavior of others; from an evolutionary perspective this has been an adaptive strategy, and yet imitation in unhealthy behavior and consumption in the modern era has been detrimental at scales of person, place and planet. The good news is that this ancestrally rooted tendency can be leveraged

toward the mimicry of behavior that promotes health, especially when there is a reward of social approval [160]. Remarkably, research shows that even though individuals discount the influence of others on their own behavior (e.g., energy conservation), it is clear that the behavior of others dramatically influences motivation [161]. This suggests that normative social messages can spread for large scale benefit, even if their influence is under-detected.

The spread of misinformation through networks is often siloed away from research on social and emotional contagion and the spread of non-communicable diseases in social networks; the seminal 2007 paper by Nicholas Christakis and colleagues showed that the likelihood of an individual becoming obese over time was significantly higher if an individual had a close friend who became obese [162]. While not without controversy, the highly cited study spawned a closer examination of the way in which social networks might play an underappreciated role in the promotion or prevention of non-communicable diseases; included in this discourse is the concept of emotional contagion—the spread of emotions (e.g., happiness, joy, depression or anger) through social networks, ranging from (for example) a small workplace to massive scales where social media users are geographically disconnected [163–166].

Among the volumes of recent evidence focused on misinformation, vaccine myths and falsehoods are now a frequent target of scientists. Thus, it is encouraging that researchers are now examining the role of social networks as a positive pathway toward “vaccination contagion”. For example, individuals exposed to friends who get vaccinated or who are exposed to friends who get the flu (as well as those with well-connected friendship groups) are more likely to get vaccinated [167]. Similar findings have been noted in regard to social networks and smoking cessation [168], while it might be tempting to dismiss these findings as simply being a product of selection—like-minded individuals being more likely to adopt friendships in the first place—at least some longitudinal research shows that social influence can shape post-friendship attitudes and behaviors [169,170]; this allows for speculation concerning the larger networks by which “friends don’t let friends” be taken in by harmful *misinformation*—be it discredited anti-vaccine rhetoric or tobacco company propaganda—or the manipulative marketing of harmful products. In any case, the research on positive social contagion may extend to many components of the person, place, planet continuum, including overall health behaviors, education outcomes, pro-environmental behaviors and civic engagement [171–173].

Included in the discourse concerning the spread of NCDs through social networks are the neoliberal policies that construct and advertise an environment filled with unhealthy choices (e.g., higher fast-food-outlet concentration and lower tobacco prices in disadvantaged communities) while disseminating narratives that promote “wellness” through a personal responsibility lens that obscures industry responsibility [51,174,175].

Since the emotional contagion through large social media platforms appears to be influenced by news reports or distant environmental factors (e.g., weather) [176,177], the need to study the saliency of positive news (as opposed to negative, divisive news which dominates in media channels) and the mechanisms by which it spreads seems urgent. In the “attention economy”, new media leverages the cognitive–emotional bias toward the “bad”—humans have stronger reactions to bad events, bad news, bad people, etc. [178]. Even if the “cleanup” of toxic misinformation were remediated effectively, it would not necessarily address the existing heavy slant toward negative (albeit accurate) news. As stated by Tyler VanderWheele and Nicholas Christakis in a recent review, “*In light of the very strong spillover and contagion, greater effort should perhaps also be given to balance negative reports with those that comment upon what is good in the community or what individuals or groups are doing to bring about a better world*” [171].

The distinction between positive, hopeful news and mere entertainment or momentary induction of pleasant mood is worth noting; research dating back to the 1940s shows that brief inductions of pleasant mood (vs. exposure to unpleasant odor) increase the ratings and social effectiveness of various political slogans [179]; since then, laboratory studies have supported the notion long held by salespersons and those in the “persuasion”

business—brief positive mood induction (e.g., through funny, entertaining video excerpts) is associated with less attention to the quality of persuasive arguments and increased belief in claims [180]. We cannot use broad brushstrokes to interpret this research; brief mindfulness interventions are also known to induce positive mood [181], yet a brief mindfulness intervention is associated with insulation against misinformation [182], and preliminary research shows mindfulness may diminish the credibility of fake news and curb the spread of misinformation on social media [183,184]. Those scoring higher in mindfulness are less concerned with how many “likes” their social media posts rack up [185]. Since most adults on social media feed forward links to articles they have not fully read (or read at all! [186]), the study of mindfulness and reflective thinking seems a worthwhile investment. As mentioned earlier, some key aspects of mindfulness training—most notably those that help suspend emotionally reactive judgment in the moment and dampen information overload [143,187]—may be an essential part of educational efforts. The potential value of mindfulness as a path to curbing materialism and unsustainable consumption patterns (and by association, NCDs such as depression, linked to materialism) has already been described [188–190]. Given this background, the evaluation of the intersection between the mood of recipients of misinformation, mindfulness and the likelihood of feeding misinformation forward would seem ripe for exploration.

As social contagion research begins to mature, the notion of “influencers” along the networks of social contacts is becoming more salient; here, the narratives that resonate (and the techniques learned from inoculation theory research) most assuredly appear to be magnified by key individuals. The case of vaccine uptake provides an example. It is already well documented that authoritarian narratives (no matter how factually correct they might be) do little to curb vaccine hesitance [191,192]. Rather, the melding of evidence-based expert advice (e.g., consensus of physicians and scientists) and experienced-based views of parents (who have vaccinated children and understand the benefits of vaccines) is transmitted across social networks more efficiently than the rote medical-based messaging of doctors [193]. Trying to determine the influencers throughout massive social networks is labor intensive; the extent to which select individuals can spread public health messages through social networks is an area of interest for researchers [194]. If research continues to demonstrate that social media mindfulness increases critical appraisal and lowers cognitive biases [183], it might suggest that those with higher levels of dispositional mindfulness would be important assets in the post-truth era—slowing the spread of misinformation and enhancing the likelihood of flourishing at scales of person, place and planet [195] (Figure 8).



**Figure 8.** True flourishing of people, places and planet requires greater emphasis on meaningful value systems, education (especially in young people), positive emotional assets, self-awareness and mutualism—conditions likely to promote more “positive contagions”.

In the Anthropocene, almost everything is morphed into showbiz—as predicted by Postman, even scientists and physicians are heralded by their social media “Kardashian Index” [196]; likes and retweets among academics and clinicians are a form of currency, even though the loudest voices on Twitter and elsewhere may have low scholarly output and/or clinical experience [197] and the extent to which “stars” of science and medicine break through the echo chamber of like-minded followers remains unknown [198]; given that just 10 percent of Twitter users are generating 80 percent of tweets in the US, diversity of thought would seem wanting [199].

## 8. Conclusions

In an era of unprecedented global challenges—poverty, socioeconomic disparities, climate change, biodiversity losses, environmental degradation, non-communicable disease prevalence, unabated rates of mental disorders, war and aggression, and bloated prison systems, to name but a few—the political and policy implications of post-truth are colossal. The unforgettable events of January 6th, 2021—the invasion of the United States Capitol building—is an identifiable manifestation of the spread of dis/misinformation [78]. If objective facts are relegated in importance, the odds would favor an exacerbation of global pathologies rather than remission. In the Anthropocene, post-truth is a potentially lethal serum.

The current COVID-19 pandemic has collided with an ongoing crisis of NCDs and an “infodemic” of misinformation. The lethality of this interaction is obvious; it has underscored the urgency of viewing the interconnected drivers of Anthropocene Syndrome. In the context of planetary health, to sidestep the problematic nature of neoliberal marketing—the propaganda and power dynamics that at once nudge toward materialism and distribute unprecedented amounts of unhealthy product, while holding the lens through which “everything” (from obesity to debt) is “personal responsibility” [200–203] could be viewed as intellectual escapism, if not intellectual dishonesty.

In addition to acute palliative efforts, curbing the unhealthy spread of misinformation requires an upstream perspective. Early education in media literacy seems urgent; in particular, it should include an understanding/appreciation of the rigor with which trusted media institutions gather and report news [204]—an educational point of reference that provides distinction on education directed at advertising literacy [137]. Greater support of public-service broadcasting may be an important pathway in broad educational efforts [205,206]. It is entirely possible to maintain or even foster a sense of awe and wonder through the process. Although our primary focus here has been on establishing an early life approach to propaganda analysis, media literacy and critical appraisal, the application and potential benefits are no less important to adults. Indeed, an unwillingness to remediate the toxic misinformation environment in the here-and-now has dangerous consequences to health on all scales. While misinformation is rampant, honesty still holds high value as an important norm for the majority of adults and can potentially be made even more salient through interventions [207]; hence, aspects of the toxic “cleanup” involve skills training *and* priming on shared social values. Perhaps, in this way, the root causes of our current grand challenges might be more easily identified, and policy/practice solutions more broadly adopted.

The WHO has identified the “infodemic” as one of our grand challenges; remediation of the toxic environment should, perhaps, occur along the lines of the WHO’s doctrine that health is not merely the absence of disease; in other words, if misinformation is a disease-causative agent, to what extent can learning in the realm of health-promoting aspects of social contagion fill in the void left by the removal of misinformation [177]. Mindfulness, best-known for its potential in personal health and flourishing at the individual level [208], may have far-reaching benefits at scales of community and planet [195,209].

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