

# The Role of Informational Ubiquity in Belief Formation

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On my honor as a University Student, I have neither given nor received  
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## **Abstract**

The rapid adoption of internet technology has led to a fundamental shift in how individuals process information. While informational ubiquity allows for unprecedented opportunity in egalitarian informational access, it has also led to a wave of misinformation and a platform for extremist rhetoric.

Many psychological mechanisms contribute to how individuals seek and synthesize information online, notably confirmation bias and the Dunning-Kruger effect. While our individual biases influence every aspect of our lives, when these play out at a global scale, they have the potential to cause significant damage. As such, it is imperative that we as a society begin to acknowledge patterns of online behavior and attempt to increase individual awareness of how we can responsibly interact with the content around us.

## **Acknowledgements and Comments**

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Additionally, Professor Gorman provided directions for edits on my thesis draft, including pointing out that my concept of misinformation spread as a failed trading zone was not accurate since these interactions were not interdisciplinary in nature. Comments regarding metacognition led to adding an additional section on how such practice can be applied in tandem with informational literacy. Finally, I sincerely appreciate his exposing me to the work of philosopher Jiddu Krishnamurti. In particular, his ideas that being human ties us all together more than any group we form, as well as the emphasis that the onus of astute informational analysis is on the individual both could not be more important to remember in today's world.

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## **The Role of Informational Ubiquity in Belief Formation**

### **Introduction**

We are rapidly approaching a society which is ubiquitously connected to the internet. According to the Pew Research Center (2019), 90% of Americans had consistent access to the internet in 2019, as opposed to 52% of the population in 2000. At the global scale, statistics from the World Bank (2017) indicate that worldwide internet adoption rates rose from 6.7% in 2000 to 49.7% in 2017.

This widespread trend of increased internet access has fundamentally changed how individuals both receive and process information. A combination of an increased rate of informational dispersal and a system of globally available information has led us to an age where any individual has the ability to both access content and disseminate their ideas at a global scale.

This egalitarian informational access has been a double edged sword in its facilitation of connection. While social media “played a crucial role in the political uprising in Tunisia and Egypt” and “a spike in online revolutionary conversations often preceded major events on the ground” in pro-democracy Arab Spring protests (Howard, 2011), the world-wide platforms afforded by major social media sites allowed for global recruitment by ISIS which continues to this day. While the internet affords opportunities for LGBT youth to safely explore their developing sexualities in spaces with sympathetic individuals (Harper, 2016) the same technologies that allow for this have directly facilitated the recent organization and action of various white nationalist groups (Daniels, 2018). With increasing reliance on AI technologies to connect people to like-minded individuals, it has become far simpler for fringe groups to communicate, be they traditionally marginalized subsections of the population who are now afforded a meeting space in what were previously fractured communities, or extremists who may be emboldened by finding individuals sympathetic towards their traditionally socially unacceptable ideologies. As Daniels mentions, our algorithmic systems are agnostic in their attempts to connect like-minded individuals, and as such these technologies have both good and bad aspects by their ethically neutral nature.

With this fundamental change in technology, we are likewise seeing a fundamental change in how people access information. As such, there is an observable shift in how the average person is forming their worldview. As of 2017, the proportion of Americans who “often received news from” social media surpassed print (Shearer, 2018). With more and more people forming their beliefs from fundamentally different (and frequently less reliable) media than generations past, it's important to analyze how people today come to their conclusions about the world they live in.

### **The Nature of Beliefs and New Media**

If we are to explore the nature of belief formation in the internet age, it is important to define the domain of our investigation. Broadly speaking, a belief is an underlying assumption or habit of mind which forms an individual's filter through which they perceive their environment and base their actions. Beliefs envelop factual statements about reality (ie. “I believe the Earth is round”), as well as ethical value judgments (“I believe people shouldn't kill each other”) and unproven/unprovable assumptions (“I believe in God”). It is important to highlight that people's beliefs are not necessarily facts. Conversely, just because something is empirically verifiable doesn't mean that everyone holds a particular fact as a belief.

There are a variety of different delineations one can make to differentiate types of beliefs, and for the purposes of the context of social interaction via the internet, it is useful to look at beliefs in a paradigm of “political” and “apolitical.” Though the exploration of how political beliefs can be manipulated via social media has been a recurring news item since the 2016 American elections in particular, for the scope of this paper, I am more interested in generalized concepts of belief formation online. In line with this demarcation, the formation of fringe apolitical beliefs seems to be a broader case study, considering that by nature apolitical concepts should have less agenda-driven argumentative information surrounding their discourse. That being said, the line between what is and isn't politicized online can frequently be blurry, often made intentionally so by politically-minded actors. This concept of politicization of fringe beliefs will be explored in more detail further on.

There appears to be a shift in the acceptability of certain, more fringe beliefs as of late. The resurgence into public discourse of concepts such as flat-earth theory and the anti-vaccination movement provides some curious case studies. Despite being thoroughly entrenched in the realm of accepted science for decades, these sort of concepts have found themselves in the limelight of internet discourse over the past several years, with their revival being concurrently timed with more widespread access to the internet (Landrum, 2019).

Upon looking into the data, an interesting correlation arises. Looking at a 2018 survey of over 8,000 Americans by YouGov regarding concepts of flat-earth theory (Nguyen H), there is a distinct pattern of younger generations being skeptical of the world being round. As age increases, there is a consistently increasing proportion of individuals who agree with the statement “I have always believed the world is round.” Whereas 94% of those surveyed over the age of 55 have remained consistent in their belief that the world is round, 66% of those between the ages of 18 and 25 have consistently believed such a statement. Compare this with data of social media and internet usage across generations (Vogels E, 2019). In this data, as of 2019, 86% of American millennials reported using social media regularly, whereas 59% of baby boomers reported likewise. The intermediate generations follow a similar curve.

I do not believe it is a coincidence that there is a pattern of younger generations being more involved in social media and simultaneously more willing to accept fringe science such as flat-earth. While modern information access has allowed for movements in favor of political freedom and civil liberties, the rise of extremist ideologies and fringe beliefs at odds with modern science cannot be ignored. I hope to investigate the psychological mechanisms at play for these patterns, as well as the role of the access to internet technology itself in this recent shift.

### **The Psychology of Social Media Consumption**

The rise of modern social media technology has fundamentally changed how the average user picks out their media to consume. Whereas in the past, the primary method of finding media was

through established platforms such as cable television or printed news, modern technology allows for an individual to pick and choose more particular media for their taste. The internet allows for a full spectrum of information and opinions, all able to fundamentally operate under the guise of an authoritative source, independent of whether or not the source itself is valid.

Internet activist Eli Pariser describes how this plays out for an individual's world-view in his 2009 book "The Filter Bubble: How the New Personalized Web Is Changing What We Read and How We Think." His essential thesis is that the age of digital media allows an individual to create their own personally curated view of the world via selectively choosing which sort of content they wish to engage with. In addition, algorithmic content delivery such as Facebook's news feed or YouTube suggestions generated in the context of a user's previous behavior lead to frequent situations where an individual is not exposed to any content outside of their preconceived world-view unless they actively seek it out. Through platforms with user-specified feeds such as Twitter or Reddit, an individual need not expand their exposure to new ideas, or even look for supporting data for their beliefs. The sort of AI systems at play from these companies will automatically populate a user's feed with material which is in concordance with content they've already consumed, which has the potential to create a self-perpetuating feedback loop of misinformation.

[Removed section on propagation of misinformation as failed trading zones, this is basically covered in the idea of the Dunning-Kreuger effect]

In line with these feedback loops, driving psychological concept in modern media consumption is confirmation bias, the concept that an individual is more likely to accept information confirming previously held beliefs. R. Nickerson summarizes the general phenomenon of confirmation bias as "people do not naturally adopt a falsifying strategy of hypothesis testing. Our natural tendency seems to be to look for evidence that is directly supportive of hypotheses we favor and even, in some instances, of those we are entertaining but about which are indifferent." I believe that this psychological tendency is critical to understanding the rise of various fringe beliefs and ideologies today.

Technology today seems to be actively facilitating confirmation bias. In addition to the algorithmic content delivery previously mentioned, the sheer volume of internet media virtually guarantees that an individual will be able to find someone echoing the sorts of sentiment they wish to see expressed. As Nickerson mentions, people do not naturally adopt logical mechanisms of challenging their beliefs. With enough delving into Google or YouTube results and selectively chosen search terms, anyone can find someone arguing essentially any conceivable viewpoint on any issue. With over 500 hours of content being uploaded to YouTube every minute (Frangoul, 2018), there is a consistent stream of whatever sort of content one may be interested in. When the goal isn't to be a better informed individual, but rather to find expressions echoing one's preexisting beliefs, discourse and nuanced analysis are no longer priorities for content creators or consumers.

Frequently, this sort of information seeking may lead to an individual falling victim to psychological phenomenon of the Dunning-Kruger effect, the recurring pattern that people tend to have a disproportionately sharp increase in their confidence regarding understanding a subject when they know only a small amount about the subject (Dunning, 2011). This explains many argumentative patterns one may observe online with the spread of fringe apolitical beliefs, as well as disinclination for individuals to change their minds on subjects they know very little about. Combined with confirmation bias and the sheer amount of available content, individuals can easily fall into a content consumption pattern where they are consistently receiving the same, limited information on a subject and becoming increasingly self-confident regarding their knowledge, potentially going on to propagate their absorbed misinformation and misinterpretations into their social networks at large.

### **Consequences of User-Driven Content Dispersal**

As mentioned, recent internet and social media technologies have given rise to an unprecedented ability for individuals to express their opinions and share their beliefs with the world. This naturally leads to another aspect of information on social media: who is creating the content being propagated through our social networks?



It is established that individuals are more likely to believe a news story when it is shared by a friend they trust in their social network (Media Insight, 2016). From a sociological perspective, this makes sense, as human survival has long been contingent on trust-based relationships with those in their community. In the past, this implicit process of social vetting has served communities well, but in the age of new media, this allows cognitive biases to easier scale from the individual to the community at large and for misinformation to spread as a consequence. For fringe beliefs that have “hit the mainstream” so to speak, seeing one's friends openly posting about an unfamiliar topic may prompt further investigation by those who otherwise wouldn't give a topic a second thought. Frequently, misinformation is trapped in a sort of incestuous bubble of keywords, so an uninformed person independently searching for truth may fall victim to more misinformation upon delving further (ie. a search of a phrase such as “vaccines formaldehyde poison” or “WiFi radiation brain damage” is inherently more likely to bring up results from fringe communities using those phrases than established medical science).

The primary issue with the pattern of new belief exposure through social networks is the inherent unreliability of the content source, and the fact that most people are simply not practiced in critically parsing information on their own. As mentioned time and time again, there are both benefits and drawbacks to the fact that anybody can publish anything. In generations prior to modern technology, the overhead for an individual producing and distributing professional-quality video content was exorbitant and completely infeasible for almost any singular person. Now with a few hundred dollars for a rudimentary webcam/microphone setup and a copy of modern video editing software, any person can say whatever they want and potentially have an audience online in a slick, easily producible style. Individuals are far more likely to believe false information presented in a quasi-professional veneer, exactly how the “fake news genre” operates, which Jana Engelhofer defines as “the deliberate creation of pseudojournalistic disinformation” (2019).

While trusting the wrong people in regards to a particular subject or being swayed by a well-

presenting individual aren't new concepts in the history of human existence, the internet certainly changes the nature and frequency with which we encounter these situations. Ideas are frequently circulated without individuals actually processing the underlying arguments. On April 1<sup>st</sup> of 2014, NPR published a joke article entitled “Why Doesn't America Read Anymore?” where the content of the article congratulated the reader on actually clicking the headline to read the article, going on to say “We sometimes get the sense that some people are commenting on NPR stories that they haven't actually read. If you are reading this, please like this post and do not comment on it. Then let's see what people have to say about this "story.”” (NPR, 2014). Needless to say, social media posts on the article were flooded with individuals who didn't read the article lamenting in their comments about society's unwillingness to read anymore (Hathaway, 2014). With the sheer volume of available content, the trend more and more is to take many headlines at face value instead of taking the time to process one source in an exhaustive manner.

While these emerging patterns of information processing are mainly consequences of the consumer's own internet usage behaviour and thus on the individual to address, the fact is that most individuals are not taking the time for self-reflection regarding their internet browsing and are thus unlikely to change any time soon. That being said, that doesn't mean content creators are unaware of these trends in informational accumulation. As mentioned, the active manipulation of political beliefs through social media has been brought into the light by recent major news events, particularly in regards to interference within election cycles (Allen, 2019). There have also been (though less overt) similar patterns in agenda-driven pushes of certain apolitical beliefs, frequently using these as a stepping stone to turn individuals towards a more politicized state of belief formation.

### **How the Apolitical is Made Political**

A common thread between many modern fringe beliefs being propagated through social media is a distrust of authority. Whereas this facet is immediately obvious for political movements, it seems to be pervasive for what are surface level non-political arguments. Anti-vaccination rhetoric is frequently

based around the concept that modern science is obfuscating the danger of vaccinations for some sort of nebulous nefarious end. Though flat-earth theory seems to be an inherently apolitical realm, the discourse is usually framed in the background of some massive world-wide conspiracy to conceal the true shape of the Earth.

It appears that much of the discourse around internet conspiracies may come from the satisfaction that an individual is “in the know” about some secret truth of the world. Any attempts to dissuade end up being dismissed with what has been referred to as the backfire effect. Matthew Wills (2017) describes the backfire effect as when “corrections actually increase misperceptions.” When someone is thoroughly enough entrenched in some sort of fringe ideology, they seem to frequently prefer the explanation that they're privy to some information, rather than having misinterpreted the facts.

Formation of fringe online communities seems to be based around a reciprocal reinforcement of this concept of special knowledge. A person can try to convince their Facebook friends not to vaccinate their children, and in the event of any sort of push-back, can have a group which will perpetuate beliefs that everyone else just “doesn't understand” or has fallen for propaganda, or is a victim of some deceit from authority. When there is an available group for a particular opinion, one need not listen to appeals to reason from the outside, as they always have the option to return to their gated community.

This feedback can, in some instances, lead to the dissolution of one's social communities in favor of those espousing their beliefs. When an individual's identity is sufficiently wrapped up in holding some idea against the norm, it can be appealing to shut off ties to one's previous community who will “just never get it.” These sort of people are also extremely susceptible to buying into more extremist rhetoric. Once a person has accepted that they may lose some social connections for their beliefs, it becomes easier to justify continuing such a process, potentially with more extreme beliefs, further eroding existing connections.

The alt-right has certainly used this concept to their advantage in recruitment. White

supremacists will regularly mix in their ideology on seemingly apolitical Facebook and Instagram pages under the shield of “edgy” jokes, and the founder of white supremacist message board Stormfront has openly admitted to individually radicalizing boys as young as 11 through social media (Gibson, 2019). One of the tactics explicitly used is to recruit individuals who interact with transgressive humor pages on social media (Wilson, 2017). Sharing this media can be something just as reinforcing against one's real-life social circles as sharing media about flat-earth and anti-vaccination. White supremacist groups go an extra step in individually messaging young men who they feel may be susceptible to this sort of messaging through applications such as the chat client Discord which allow for more direct targeting (Kamenetz, 2018).

### **Addressing the Spread of Misinformation**

In light of the current patterns in informational spread, we inevitably find ourselves questioning how we may mitigate the negative effects of these technologies. It is important to reiterate that the same factors which allow the internet to empower marginalized groups and give a voice to those stigmatized by society allow the widespread dispersal of false information and the development of potentially dangerous extremist beliefs. It may be that we simply have to step back and assess the new paradigm of information technology while accepting things as what they are.

It is clear that the new paradigm of belief formation from internet sources will require fundamental changes in ideas of truth at the societal level. Sheila Jasanoff defines a “serviceable truth” as “a state of knowledge that satisfies test of scientific acceptability and supports reasoned decision-making, but also assures those exposed to risk that their interests have not been sacrificed on the altar of an impossible scientific certainty” (1990). It is not certain that the idea of a serviceable truth is plausible in the information age society. In the context of something like anti-vaccination, it is impossible to satisfy the criteria of assuring particular individuals that their interests are safe. In the case of vaccines, would we be able to eradicate smallpox if the vaccine were discovered today instead of in the pre-internet era?

As for the rise of fringe ideologies with violent results, action can be taken to address the spread of dangerous beliefs, but it is uncertain if this is a winnable game, so to speak. Despite claims that their AI tools take down 99% of radical Islamic content, ISIS recruitment groups are still easily accessible on Facebook (Silver, 2018). The site creator of anonymous image board 8chan, a site with extremely libertarian free-speech policies, voluntarily shut the site down after both the New Zealand and El Paso shooters posted manifestos to the site prior to their killing sprees (Roose, 2019). Though taking down the site obviously removes a locus for that sort of conversation, the sheer scale of the internet assures that violent extremists will just find a new site to congregate towards in a matter of time.

Perhaps the most likely avenue of mitigating the societal damage these technologies may inflict is having open conversation surrounding the topic of belief formation and trying to increase our general awareness of the issue of misinformation so we are less likely to individually fall into flawed reasoning. The public lexicon has expanded in the past several years to include concepts like “fake news,” but even the definition of that term has become muddled to the point where it no longer refers to widespread purposeful misinformation operating under the guise of a credible source (Egelhofer). It has become apparent that more directed education regarding critically parsing information on the internet may be required in the long-term.

The STS framework of anticipatory governance provides a useful model for this problem. Defined by David Guston as “a broad-based capacity extended through society that can act on a variety of inputs to manage emerging knowledge-based technologies while such management is still possible,” anticipatory governance seems to be a factor of informational processing we need to address sooner rather than later. While “governance” regarding misinformation in the traditional, legislation based capacity is fundamentally at odds with the United States' Bill of Rights regarding free speech, intermediate measures can be taken to mitigate this problem. Primarily, it is of utmost importance to expose upcoming generations to the concept of “informational literacy” and best practices for critically parsing information they may encounter.

Robert Burnhein defines informational literacy as “[the ability] to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information” (1992). Never has this concept been more important than in the information age. While most references to this concept at present are currently within the context of higher education, there is certainly the opportunity to more explicitly teach this concept throughout secondary education, particularly as coursework at every level shifts more and more towards an online locus.

For the purposes of education, informational literacy need not be overly complicated, but could rather be framed in the manner of good habits for one's informational diet. Such concepts could be checking other content from an author or publication to determine if there is an underlying bias in content. Sources may have a particular ideological leaning that is consistent across content, which becomes more obvious upon looking further into more than just one piece of media. One need not detach themselves from any biases, but they should at least be aware that the content they are consuming may have a certain leaning. Recognition that headlines on the internet are frequently hyperbolized to draw in attention and web traffic is another important concept to teach individuals. Similarly, investigating credentials of content creators (particularly for self-published content such as blogs or YouTube videos) is an important first step for assessing potential informational validity. Informing people of the sort of tactics used by potentially nefarious actors online is a precautionary measure akin to best practices for avoiding sexual predation online, and framing it within the consequences that radicalization may have on one's societal interactions could prevent susceptible individuals from falling into these scenarios altogether. There are many other potential guidelines which are ideologically agnostic that can easily be taught at young ages to prepare them for the rest of their online lives.

Going hand-in-hand with the idea of informational literacy is the more broad concept of metacognition, or the concept of being aware of one's own thought patterns. This idea which has pervaded history from Aristotle to modern cognitive behavior therapy techniques allows for making

more generally informed decisions in all aspects of life and is particularly important in the context of processing information gleaned from the internet. Whereas informational literacy is limited to best practices in parsing content, metacognition more generally can be used to drive best practices in thought, with informational assessment being a subset of the same sort of processes. Though this is a skill that requires concerted effort to learn, it can be learned and let us as individuals step back and assess the way that the content we consume influences our beliefs and behaviors. Furthermore, stepping back from our own personal filter bubbles can lead us to act in manners not just benefiting us as individuals, but the people around us and the universe at large.

Overall, the spread of maladaptive beliefs online is unavoidable due to the egalitarian nature of the internet itself, however there are actions we can take as a society to prepare future generations for this. Informational literacy may be the key to successful, well-informed internet citizens. The fact is that increasing education on informational literacy transfers to benefits in other facets of life. Being able to appropriately parse sources means one can more adequately educate themselves on any topic. The internet is the most incredible human invention as to increasing our knowledge, and proper education in how to get the most out of it will inevitably benefit society as a whole.

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