

# A Reasoned Approach to Dealing With Fake News

M. Anne Britt<sup>1</sup>, Jean-François Rouet<sup>2</sup>,  
Dylan Blaum<sup>1</sup>, and Keith Millis<sup>1</sup>

Policy Insights from the  
Behavioral and Brain Sciences  
2019, Vol. 6(1) 94–101  
© The Author(s) 2018  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/2372732218814855  
journals.sagepub.com/home/bbs



## Abstract

We now have almost no filters on information that we can access, and this requires a much more vigilant, knowledgeable reader. Learning false information from the web can have dire consequences for personal, social, and personal decision making. Given how our memory works and our biases in selecting and interpreting information, now more than ever we must control our own cognitive and affective processing. As examples: Simply repeating information can increase confidence in its perceived truth; initial incorrect information remains available and can continue to have an effect despite learning the corrected information; and we are more likely to accept information that is consistent with our beliefs. Information evaluation requires readers (a) to set and monitor their goals of accuracy, coherence, and completeness; (b) to employ strategies to achieve these goals; and (c) to value this time- and effort-consuming systematic evaluation. Several recommendations support a reasoned approach to fake news and manipulation.

## Keywords

fake news, argumentation, cognitive and affective processing, memory biases, belief biases, confirmation bias, epistemic vigilance, social media

## Tweet

Supporting a reasoned approach to addressing fake news.

- Funding agencies need to support rigorous interdisciplinary research on argumentation and persuasion.

## Key Points

- Our interpretation of information is guided by our goals and prior beliefs.
- Recalling information can change our memory and beliefs (false memory effect) while information we later find out was incorrect remains in memory and can continue to affect us (continued influence effect).
- Information repetition increases belief in its truth (illusory truth effect), and we are more likely to accept belief-consistent information (belief consistency) without seeking out disconfirming information (confirmation bias).
- Educators, journalists, and government agencies need to make people aware of these biases and the need to set goals to evaluate information for accuracy, relevance, and sufficiency. Awareness can, to some extent, help to counteract these biases.
- Political and business leaders need to adopt regulations and/or guidelines to both inform the public about their susceptibility to cognitive biases and, wherever possible, prohibit their use for fraudulent commercial and other anti-social purposes.

## Introduction

On December 4, 2016, Edgar Maddison Welch fired an AR-15 assault rifle inside the Comet Ping Pong pizza restaurant in Washington D.C., while on a self-appointed mission to save children being held captive in the basement as part of sex-trafficking ring. According to stories circulating on the web at that time, Hillary Clinton was the head of the satanic sex ring using the restaurant. Welch was arrested, and no one was killed or injured, but how did he come to believe these conspiracy stories enough to decide to “self-investigate” with an AR-15 rifle? In a December 7, 2016, interview with the *New York Times*, Welch explained that there were many different sources on the Internet leaving him with the “impression something nefarious was happening” (Goldman, 2016). He also routinely listened to Alex Jones, an Internet

<sup>1</sup>Northern Illinois University, DeKalb, USA

<sup>2</sup>Université of Poitiers, France

### Corresponding Author:

M. Anne Britt, Northern Illinois University, 400 PM Building, DeKalb, IL 60115-2828, USA.

Email: [britt@niu.edu](mailto:britt@niu.edu)

entertainer who promotes conspiracy theories. Welch said that his intel was not 100%, but his goal was to “self-investigate” the situation.

In fact, the so-called “Pizza Gate” conspiracy spread quickly on the Internet immediately before the November 2016 U.S. election. On October 30, a Facebook account using a fake identity posted that the NYPD suggested that emails found 2 days earlier on a laptop owned by a Clinton aide pointed to a Hillary Clinton pedophilia ring. This was quickly reposted thousands of times. On November 4, Alex Jones (of the former InfoWars website) pronounced on one of his programs: “When I think about all the children Hillary Clinton has personally murdered and chopped up and raped, I have zero fear standing up against her,” [. . .] “Yeah, you heard me right. Hillary Clinton has personally murdered children. I just can’t hold back the truth anymore” (Fisher, Cox, & Hermann, 2016). Within a few days, the news snowballed as #pizzagate Twitter topic received millions of retweets, many from foreign accounts (e.g., in the Czech Republic) and bots, and became “trending” news on Facebook (based on frequency algorithms alone). Also helping to spread the story were “citizen journalists.” According to a *Washington Post* interview (Fisher et al., 2016) with one, “MacWilliams calls herself a journalist, but she does not try to be ‘100 percent accurate,’ either. She believes the beauty of the Internet is that people can crowdsource the truth. Eventually, what is real will emerge, she said.” The article concluded, “Pizzagate—[. . .] is possible only because science has produced the most powerful tools ever invented to find and disseminate information.”

Americans acknowledge both the positive and negative aspects of the Internet (Pew Research Center, 2018). Clearly the Internet is helpful in gaining access to news, connecting people, and learning new skills. *Negatives include fake news and misinformation, as well as privacy issues.* The pizzagate incident points to several important challenges. In this new world, there are few if any gatekeepers for “truth”—The spread of information can be driven by many forces other than usefulness and reliability; for instance, the need to attract viewers to drive advertising revenue, fame, the sense of being part of something larger than ourselves. And in the end, it can have serious consequences beyond the intentions of the original source. Now more than ever, members of our society need to become aware of their own cognitive biases and how to avoid being exploited because of them.

## Overview of Cognitive Biases

Biases result from how memory operates and how attitudes shape new information.

### Memory Biases

One common source of bias is the human memory system. Research shows that memory does not work like a video

recording of our life. Although we may briefly have a *verbatim representation* of the exact words of a text, these details are quickly lost without attention-demanding retention strategies, such as rehearsal (Sachs, 1967). We use our verbatim representation to create an interpretation of the author’s message by making connections to our prior knowledge and beliefs (Kintsch, 1998). In addition to representing the content, we can also represent the source of the communication (e.g., Alex Jones of InfoWars) and associate content with a source and even identify relationships among sources (e.g., Alex Jones and @DavidGoldbergNY agree; while Reddit owners disagree) (Perfetti, Rouet, & Britt, 1999). In this way, we can represent otherwise inconsistent information across texts or webpages.

The nature and extent of this processing will depend on why a person is reading. People read information on the web for a variety of reasons, including relieving boredom, keeping up-to-date on something, looking up something to do some task. In general, we read for a purpose or goal (Britt, Rouet, & Durik, 2018), and these goals can impact what we read (e.g., CNN, FOX, Facebook posts), how we read (e.g., read only headlines and leads, read deeply, skim, skip until locate a piece of information), how long we read, and so forth. We do not simply represent only what the text says. We interpret the text, guided by our goals and based on prior knowledge as well as our *attitudes* and *beliefs* (Albarracín & Shavitt, 2018; Falk & Scholz, 2018).

One set of biases originate with the quick loss of verbatim memory and potential overreliance on an interpreted representation of the communication. For example, in one study, college students who were asked to read short, two-sentence arguments (e.g., “The U.S. is right to intervene in other countries’ affairs because local events can catastrophically impact the entire world.”) were only about 75% accurate at recalling the claim of the argument *immediately* after judging their agreement with it (Britt, Kurby, Dandotkar, & Wolfe, 2008). Furthermore, the errors they made most often changed the meaning of the claim, although it may seem minor to the untrained eye (e.g., “The U.S. *should intervene* in other countries’ affairs”).

The problem of relying on an interpreted representation is illustrated in a well-known series of studies showing false memories can be created based on the situation at retrieval (*false memory effect*). Two groups of people watched a video of a car accident, and one group was asked how fast the car was going when it “smashed” into the other car. The other was asked how fast it was going when it “bumped” into another car (Loftus, 1979). People falsely remembered the car going faster in the first case, and they were very certain that they had an accurate memory. This false memory effect can be reduced (but not eliminated) when a “false memory warning” is given prior to encoding (Roediger, 1996). But, when the warning is given *after* encoding, people are still likely to “remember” the false information and use it as if were true (Roediger, 1996). The effect is amplified the more

often we encounter and retrieve the information (Roediger, Jacoby, & McDermott, 1996).

People are also highly affected by the mere repetition of information. Researchers have found that statements presented several times across occasions, led to more confidence in the truth of those statements as compared with statements that were not repeated (*illusory truth effect*) (Polage, 2012). A related effect, *availability cascade effect*, shows how this illusory truth effect can snowball at a more global level. Kuran and Sunstein (1999) presented an analysis of the public attention and attitude toward three events (waste dumps in the Love Canal, the use of Alar chemical, and the TWA 800 crash) to show how repeated statements of beliefs can make claims seem truer and can be used to manipulate public opinion. It would seem inevitable that in an information environment such as the Internet, social media algorithms that identify and highlight “trending” stories and source filters that restrict alternative information would produce an availability cascade.

Finally, *our memory system does not handle new discrepant information by simply replacing old information*. That is, initially faulty or wrong information remains available and can continue to have an effect despite encoding new, correct information. This is called the *continued influence effect* (Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012). For example, when people read a story about a warehouse fire that was initially reported to be caused by oil paint cans but later discounted, readers continued to think that the fire was caused by the paint cans (Johnson & Seifert, 1994). If you think of human memory like a collection of assertions networked together by associative links of varying strength, updating information is more akin to creating a new link that tags the information as wrong but doesn’t remove it. Nevertheless, such a tag might be limited in scope, applying to one specific assertion but not to all the other information in memory connected to that assertion. In this case, the updated information will not necessarily be stored with the later-found-erroneous information without systematic updating all of the information learned. This continued influence of misinformation effect is difficult to overcome (Lewandowsky et al., 2012) and can even backfire, as discussed below.

### Prior Belief Biases

In addition to these memory related problems, several biases relate to those assertions categorized as beliefs or attitudes. In general, these biases affect what information we choose to attend to and how we process it, usually in the direction of maintaining the consistency of our attitudes and beliefs. Our beliefs can lead to biased search, selection, and interpretation—thereby reducing exposure to information that is not consistent with what we already believe.

We are more willing to accept consistent information and judge the quality of arguments more positively when they are consistent with our beliefs, as compared with information

that opposes our beliefs (*belief bias*; Lord, Ross, & Lepper, 1979). The other half of the belief bias effect is that we are also less likely to accept information that goes against our beliefs and judge the arguments as being of a lower logical quality (Edwards & Smith, 1996). We are more likely to scrutinize or attempt to find holes in the information that contradicts our beliefs. In fact, in some cases, when we encounter disconfirming evidence, it may actually strengthen our evidence-opposing previous beliefs (*backfire effect*) or reject information because of the source it came from. All of these biases are exacerbated by our tendency to believe we are more unbiased reasoners than others (*bias blind spot*; Pronin, Lin, & Ross, 2002).

We also have a strong tendency to seek out and use information that is in line with what we already believe to be true (*confirmation bias*; Nickerson, 1998); that is, we seek out information that confirms our beliefs rather than seeking information that could potentially disconfirm them. We also have a *myside bias* toward generating belief-consistent reasons (Baron, 1995) and ignore evidence counter to our own side when performing tasks such as writing an argumentative essay (Wolfe & Britt, 2008). Finally, beliefs even affect comprehension: readers spend longer rereading text that is contrary to their beliefs (Maier, Richter, & Britt, 2018) but have better memory for information that is consistent with them (Maier & Richter, 2013).

These biases are challenging to overcome because the Internet is being designed to create “filter bubbles” which as Bill Gates notes, let “you go off with like-minded people, so you’re not mixing and sharing and understanding other points of view. It’s super important. It’s turned out to be more of a problem than I, or many others, would have expected” (Delaney, 2017, para. 5).

### Challenges for the Reader

In addition to memory and belief biases that influence what information people store, people exhibit biases in how they reason about information. Our focus on reading is warranted by the fact that most of the information on the Internet is still conveyed through written texts (admittedly often in combination with speech and pictures) and that most adults have only a limited ability to understand and reflect critically on what they read (Organisation for Economic Co-Operation and Development, 2013). In this next section, we discuss how people read and evaluate the support encounter for persuasive claims. The three characteristics for support can include assessing whether the support is accurate, coherent, and complete (Blair & Johnson, 1987).

### Assessing the Accuracy of Information

People typically assume what others say is truthful and accurate unless there is reason for doubt (Grice, 1975). However, our cognitive biases work against accuracy evaluation

especially when we rely on our memory, as the previous section reviewed.

Accurate evaluation requires readers to *set and monitor accuracy as a goal, employ strategies* to achieve that goal, and *value* the time and effort-consuming systematic evaluation. Often when reading on the web, one has many competing goals; obtaining and verifying that the information is accurate is only one goal. Monitoring for accuracy may not have been a well-practiced cognitive activity in the past, but it must become one today. Now more than ever, readers have to assess the accuracy of information that can range from clearly true or false to indeterminable. Indeed, the amount of falsehood and deception on the web has given rise to a plethora of fact-checking sites (e.g., <https://www.snopes.com/>, <http://www.politifact.com/>, and <https://www.factcheck.org/>), and even Google and Facebook have begun efforts to label suspect stories.

Strategies for evaluating accuracy can target the content itself. Readers can actively question whether they find the information believable, whether it makes sense or is consistent with prior knowledge (Richter, Schroeder, & Wöhrmann, 2009). We have to monitor and protect against our belief bias because related beliefs are quickly available (Voss, Fincher-Kiefer, Wiley, & Silfies, 1993). This takes a deliberate effort of setting a goal to acquire accurate information. The content can also be evaluated for accuracy based on an assessment of the support provided. Some types of evidence are better (e.g., experiments, quotes, reasoning) than others (e.g., number of retweets). The evaluation of what makes “good” support, however, depends on several factors: (a) one’s epistemic beliefs about what knowledge is (e.g., tentative and complex), and (b) beliefs about how we get knowledge (e.g., gut feelings vs. authority vs. use of rules of inquiry) (Bråten, Britt, Strømsø, & Rouet, 2011) and (c) other knowledge, skills, and dispositions that lay readers often lack. Even undergraduate college students are not very skilled in detecting problems in descriptions of scientific studies (Kopp, Britt, Millis, & Graesser, 2012) and do not spontaneously set an explicit goal to obtain accurate information when reading search-result listings of global warming sources (Kopp, 2013). Instead, they are “looking for support,” though not necessarily accurate support.

Readers can also evaluate features of the source of the information. Given that we cannot erase or overwrite memory, evaluating the source information would be most beneficial prior to encoding the content so that the reader can decide whether the source is reliable and knowledgeable enough for the reader to continue.

To illustrate, searching a news aggregator site for “Betsy DeVos” returned links to very different sites (e.g., “*The Washington Post*,” “Politico,” and “Reason.com”) that vary in terms of features of the author (e.g., author’s level of knowledge, motives, or bias) and outlet (e.g., criteria for accuracy checking, checking tools employed). This is the

easy case if one sets the goal to encode and evaluate the source (which is not often a reading goal). The reader also has to be able to understand that when a site uses a headline like “DeVos: Civil rights office will return to being a neutral agency,” it is stating that DeVos is saying “Civil rights office will return to being a neutral agency.” DeVos becomes the source of the statement, and the reader’s knowledge of and evaluation of DeVos can be used to interpret it. In this case, the source precedes the content which helps. But in many cases, the source of a statement comes after the content has been encoded, which is a problem because it is now in our memory before we know whether we trust the source. An even more challenging example is when all that is stated to entice a click is “Betsy DeVos isn’t ‘Enabling rape deniers’ by pushing for due process on college . . .” Without clicking, it is not possible to know who is saying that Betsy DeVos is “enabling rape deniers.” This is challenging, because reading headlines without clicking to read the details is very common—leaving the reader with a memory of an assertion without being able to evaluate whether the source was knowledgeable or biased.

In the case of a news aggregator, some source information is actually presented. Many times, however, there is no information about key features of the author or outlet responsible to distribution. Even worse, the source information can actually be deceptive. For example, “ABCnews.com.co” or “Breaking-CNN.com” are sites that mimic the look, feel, and logo of actual news sites but may present erroneous information and malware. When we talk with people in real life, their “sourceness” is obvious. On the Internet, the author as an entity can be obscured or even falsified (Britt, Rouet, & Braasch, 2013).

Finally, readers can look to corroborate information across independent sources. However, it can be challenging to find truly independent sources. For example, it may be that only one source came to the conclusion that 2 to 3 million illegal immigrants voted in the U.S. election, but one could have encountered it on Facebook, in discussion with friends and family, and on the television news. This could appear as corroboration, but it is not, because the information originally came from a single source.

### *Assessing the Relevance of Support and Search Results*

Relevance of information can be evaluated according to goals for search (e.g., Does this page, article, or even paragraph give me the information that I am looking for?) or coherence (e.g., Does the support provided for their claim actually provide support? or Does the effect follow from the cause?).

For brevity sake, consider judging claim-support relevance. Of course, persuasion techniques, propaganda, and logical fallacies (e.g., ad hominem, emotional appeals) are

very prevalent on the web and can be persuasive, but they are beyond the scope of this article. Here we focus on an appeal to reason.

Again, our cognitive system can work against the use of accurate reasoning. Relying on an interpreted representation makes it difficult to accurately evaluate whether the support is relevant for the specific claim made (we discuss this in more detail below). Indeed, readers may set a goal to identify support but not necessarily “good” support (Kopp, 2013), and this may lead to accepting all support as “good” without much evaluation. As a result, a wider range of support may be seen as acceptable. As noted, our beliefs can also interfere. We spend longer reading belief-inconsistent information to scrutinize it and often judge those arguments as of lower quality, whereas we read belief-consistent information more quickly and typically judge it to be of higher quality. Judging the quality of an argument, independent of one’s acceptance of its truth, is difficult.

Even with arguments for which one does not have strong beliefs, evaluation can be challenging. College students experience difficulty evaluating arguments that are structurally flawed (i.e., the reason failed to support the claim or there was no reason presented) as compared with those that are structurally acceptable (i.e., the reason supported the claim; Larson, Britt, & Kurby, 2009). It is even more challenging to evaluate argument elements that are spread across time or an expanse of text. Doing so requires one to hold in working memory the precise claim, while trying to detect the support, sometimes needing to go back and reread the precise claim. This type of monitoring takes effort. Readers have difficulty noticing discrepancies in even short texts (Otero & Kintsch, 1992), although they are slightly better when the discrepant statements come from different sources (Braasch, Rouet, Vibert, & Britt, 2012; Stadler, Scharrer, Brummernhenrich, & Bromme, 2013). Thus, lay readers may find it challenging to monitor and evaluate the logical claim–reason connection.

### *Assessing the Sufficiency of Support and Perspectives*

A final criterion for argument support is whether it is sufficient, that is, complete to some degree and capable of justifying the claim. Professional writers and news reports typically consider more than a single perspective (Wolfe & Britt, 2008), and it is the hallmark of academic writing and the scientific method. For the rest of us, comparing perspectives can help us understand the broader situation and make an informed decision.

Biases are most prevalent for this criterion of support. As the belief bias shows, we are less likely to believe things that are inconsistent with our views. We also have poorer memory for belief-inconsistent information. College students tend to ignore other-side information when composing

argumentative essays (Nussbaum, Kardash, & Graham, 2005; Wolfe, Britt, & Butler, 2009) and they often do not make alternative-based objections when evaluating arguments without task supports (Shaw, 1996). Readers often do not seek out alternative perspectives or disconfirming evidence, but when available, they do read some of it, although generally do not include it in their arguments (Wolfe et al., 2009).

As with the other two evaluations, working against the myside bias and confirmation bias takes effort and requires that readers set specific goals to seek out, comprehend, and consider other-side information. In its simplest form, it means trying to find articles on the web that argue for the other side of the claim. It can also mean trying to find and account for all available evidence, regardless of side of the claim it supports. It can also mean taking into account multiple sides or perspectives and therefore include or address the “alternative viewpoints” or even a range of political camps (e.g., fiscal conservative, liberals, social conservatives, and moderates). This is challenging when only one side is presented because it requires the search for alternative perspectives without knowing what those perspectives are or how to find out about them. It is also challenging with multiple texts (for instance a series of chat messages or Google page lists) because it requires reading more, comparing information, and possibly dealing with the emotions that come from reading perspectives outside one’s own. It is not something even college students take on readily (Kopp, 2013).

### **Policy Recommendations**

Although we have described several ways that cognitive biases leave people susceptible to misinformation and exploitation, there are steps that policy makers can take to mitigate the problem. We present some thoughts below.

#### *Epistemic Vigilance Needs to Be Taught and Not Just in School*

In the world of InfoWars, the public needs to acquire the intellectual skills needed to critically assess the accuracy, soundness, and sufficiency of information, in other words, epistemic vigilance. This review points to the insufficiency of teaching simply rules (e.g., use “.gov” sites, look for an M.D.). Rules do not help because the principle behind the rule is lost, and technology advances occur too quickly for heuristics to be useful. Instead, we need to teach the public how our memory and comprehension processes work and how our biases can lead us to fall prey to manipulators. Ideally, a citizen should be aware that conclusions from reading a post may be affected by the post’s wording, context, the reader’s own prior beliefs, and the presence of similar posts. We also have to teach the public how to evaluate information

for accuracy, relevance/soundness, and sufficiency. This includes understanding what constitutes reason-based argumentation and how that differs from persuasion and other forms of belief change. We also have to teach the importance of applying this knowledge, especially when emotions run high and when the information relates to their beliefs.

In schools, we need interdisciplinary experts (e.g., journalists, information-science experts, teachers, cognitive scientists) to work together to develop curricula that can support the development of transferable knowledge. We also need professional development to support teachers in implementing effective instructional approaches to epistemic vigilance.

But teaching epistemic vigilance should not be limited to school. Bad actors throughout the world recognize that social media is an effective way to influence the fabric of our democratic society (e.g., elections, beliefs, harmful actions). And they are correct. The problem is too important to be limited to a few lectures or activities during school hours. It is even possible that Welch would have acted differently if epistemic vigilance was in the zeitgeist. Learning cannot end with primary or secondary schooling. Presumably, new technologies will emerge that will need new forms of epistemic vigilance. For example, DeepFakes are realistic videos which show someone (politician, celebrity) saying something that they did not say. Because they are hard to detect, the public has a right to be educated about them and ways to detect them. A step toward this goal would be public service announcements on the potential dangers of having low epistemic vigilance, such as psychological (e.g., trolls), physical (e.g., swatting), and financial (e.g., phishing) harm.

### ***We Need a Set of Regulations or Guidelines for Using Social Media, Based on Ethics and Awareness of Cognitive Biases***

Another recommendation is to focus on knowing how posts can lead to harmful actions taken by others. We think that the initial “pizza gate” Facebook post is akin to shouting “fire” in a movie theater in its outcome. Indeed, recent evidence suggests that people contribute more to spreading false news than robots (Vosoughi, Roy, & Aral, 2018). Whether it is a single malevolent person who gets people to falsely run for their lives, or an inaccurate viral post that roils up Internet users, people are potentially harmed (e.g., Mele, 2016). We note that over the past 15 years, social media companies have gradually implemented rules of use, but we think they should be scrutinized in regard to ethics and factors that affect epistemic vigilance. For example, should a tweet be retweeted if there is clear evidence that the information is suspect? It is possible that pizzagate could have been prevented if more was done to prevent the number of inaccurate posts that resulted from the initial inaccurate one. It is true that Alex Jones was ultimately kicked off YouTube, Facebook, and Twitter, but

it took a while. Public policies and regulations may be the next condition for the sustained development of public communication online. Governments have set up agencies dedicated to understanding, tracking, and educating citizens on potential harmful events (e.g., the Centers for Disease Control and Prevention; National Institutes of Health). Regulations have also been created and enforced to limit the negative impact of major innovations such as the automobile. With the growth of social media, news agencies, and the availability of the Internet, we believe, comes the responsibility to identify causes of harmful events (e.g., “pizzagates”, bullying, school shootings) and the proliferation of inaccurate information via the web. Of course, the United States guarantees free speech, but there are limits to free speech when it promotes illegal activity, obscenity, or pandemonium. In some countries, laws prohibit public statements of racial hatred or insults toward law enforcement officers. The European Union has recently begun to take steps for countering fake news (European Commission, 2018). Just like the automobile created a need for traffic lights and speed limits, the Internet calls for some sort of guidelines as to what is permissible to post given human inadequacies in regard to the search for truth. Clearly, one’s motivation to find “the truth” is not enough because Welch was in pursuit of the truth, but likely fell prey to the illusory truth effect.

### ***More Funding Is Needed to Understand and Teach Epistemic Vigilance***

In 2009, the U.S. Department of Education’s Institute of Education Sciences launched the “Reading for Understanding Research Initiative” to fund projects to extend reading research beyond decoding and simple coherence-based inferencing (Douglas & Albro, 2014). We need similar leadership to drive rigorous interdisciplinary research to examine developmental trajectories, longitudinally, to study argument comprehension, evaluation, and production as well as factors relating to epistemic vigilance. We need to identify suitable interventions for different populations of readers in K-12 and adulthood. We also need developmental data to understand what is appropriate (e.g., perspective taking, coordinating cognition, attention and inhibition, strategic processing, epistemic beliefs) for a given population.

This review points to the need to support a reasoned approach to addressing fake news as a society.

### **Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### **Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## References

- Albarracín, D., & Shavitt, S. (2018). Attitudes and attitude change. *Annual Review of Psychology, 69*, 299-327.
- Baron, J. (1995). Myside bias in thinking about abortion. *Thinking & Reasoning, 1*, 221-235.
- Blair, J. A., & Johnson, R. H. (1987). Argumentation as dialectical. *Argumentation, 1*, 41-56.
- Braasch, J., Rouet, J.-F., Vibert, N., & Britt, M. A. (2012). Readers' use of source information in text comprehension. *Memory & Cognition, 40*, 450-465.
- Bråten, I., Britt, M. A., Strømsø, H. I., & Rouet, J.-F. (2011). The role of epistemic beliefs in the comprehension of multiple expository texts: Towards an integrated model. *Educational Psychologist, 46*, 48-70.
- Britt, M. A., Kurby, C. A., Dandotkar, S., & Wolfe, C. R. (2008). I agreed with what? Memory for simple argument claims. *Discourse Processes, 45*, 52-84.
- Britt, M. A., Rouet, J.-F., & Braasch, J. L. G. (2013). Documents as entities: Extending the situation model theory of comprehension. In M. A. Britt, S. R. Goldman, & J.-F. Rouet (Eds.), *Reading: From words to multiple texts* (pp. 160-179). New York, NY: Routledge.
- Britt, M. A., Rouet, J.-F., & Durik, A. M. (2018). *Literacy beyond text comprehension: A theory of purposeful reading*. New York, NY: Routledge.
- Delaney, K. J. (2017, February). Filter bubbles are a serious problem with news, says Bill Gates. *Quartz*. Retrieved from <https://qz.com/913114/bill-gates-says-filter-bubbles-are-a-serious-problem-with-news/>
- Douglas, K. M., & Albro, E. R. (2014). The progress and promise of the reading for understanding research initiative. *Educational Psychology Review, 26*, 341-355.
- Edwards, K., & Smith, E. E. (1996). A disconfirmation bias in the evaluation of arguments. *Journal of Personality and Social Psychology, 71*, 5-24.
- European Commission. (2018). *A multi-dimensional approach to disinformation. Report of the independent high level group on fake news and online disinformation*. Brussels, Belgium: European Union. Retrieved from <https://ec.europa.eu/digital-single-market/en/news/final-report-high-level-expert-group-fake-news-and-online-disinformation>
- Falk, E., & Scholz, C. (2018). Persuasion, influence, and value: Perspectives from communication and social neuroscience. *Annual Review of Psychology, 69*, 329-356.
- Fisher, M., Cox, J. W., & Hermann, P. (2016, December 6). Pizzagate: From rumor, to hashtag, to gunfire in D.C. *The Washington Post*. Available from <https://www.washingtonpost.com/>
- Goldman, A. (2016, December 7). The Comet Ping Pong gunman answers our reporter's questions. *The New York Times*. Available from <http://www.nytimes.com>
- Grice, H. P. (1975). Logic and conversation. In P. Cole, & J. L. Morgan (Eds.), *Syntax and Semantics, Vol. 3: Speech Acts* (pp. 41-58). New York: Academic Press.
- Johnson, H. M., & Seifert, C. M. (1994). Sources of the continued influence effect: When misinformation in memory affects later inferences. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 20*, 1420-1436.
- Kintsch, W. (1998). *Comprehension: A paradigm for cognition*. Cambridge, UK: Cambridge University Press.
- Kopp, K. J. (2013). *Selecting and using information from multiple documents for argumentation* (Doctoral dissertation). Northern Illinois University, DeKalb.
- Kopp, K. J., Britt, M. A., Millis, K., & Graesser, A. (2012). Improving the efficiency of dialogue in tutoring. *Learning and Instruction, 22*, 320-330.
- Kuran, T., & Sunstein, C. (1999). Availability cascades and risk regulation. *Stanford Law Review, 51*, 683-768.
- Larson, A. A., Britt, M. A., & Kurby, C. (2009). Improving students' evaluation of informal arguments. *Journal of Experimental Education, 77*, 339-365.
- Lewandowsky, S., Ecker, U. K., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and its correction: Continued influence and successful debiasing. *Psychological Science in the Public Interest, 13*, 106-131.
- Loftus, E. F. (1979). *Eyewitness testimony*. Cambridge, MA: Harvard University Press.
- Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology, 37*, 2098-2109.
- Maier, J., & Richter, T. (2013). Text-belief consistency effects in the comprehension of multiple texts with conflicting information. *Cognition and Instruction, 31*, 151-175.
- Maier, J., Richter, T., & Britt, M. A. (2018). Cognitive processes underlying the text-belief consistency effect: An eye-movement study. *Applied Cognitive Psychology, 32*, 171-185.
- Mele, C. (2016, September 12). Creepy clown hoaxes lead to 12 arrests in multiple states. *The New York Times*. Retrieved from <https://www.nytimes.com/2016/09/30/us/creepy-clown-hoaxes-arrests.html>
- Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology, 2*, 175-220.
- Nussbaum, E. M., Kardash, C. M., & Graham, S. E. (2005). The effects of goal instructions and text on the generation of counterarguments during writing. *Journal of Educational Psychology, 97*, 157-169.
- Organisation for Economic Co-Operation and Development. (2013). *OECD skills outlook 2013: First results from the survey of adult skills*. OECD Publishing. doi:10.1787/9789264204256-en
- Otero, J., & Kintsch, W. (1992). Failures to detect contradictions in a text: What readers believe versus what they read. *Psychological Science, 3*, 229-236.
- Perfetti, C. A., Rouet, J.-F., & Britt, M. A. (1999). Towards a theory of documents representation. In H. van Oostendorp & S. R. Goldman (Eds.), *The construction of mental representations during reading* (pp. 99-122). Mahwah, NJ: Lawrence Erlbaum.
- Pew Research Center. (2018). *Declining majority of online adults say the internet has been good for society: At the same time, the contours of connectivity are shifting: One-in-five Americans are now "smartphone only" internet users at home*. Retrieved from <http://www.pewinternet.org/2018/04/30/declining-majority-of-online-adults-say-the-internet-has-been-good-for-society/>
- Polage, D. (2012). Making up history: False memories of fake news stories. *Europe's Journal of Psychology, 8*, 245-250.

- Pronin, E., Lin, D. Y., & Ross, L. (2002). The bias blind spot: Perceptions of bias in self versus others. *Personality and Social Psychology Bulletin, 28*, 369-381.
- Richter, T., Schroeder, S., & Wöhrmann, B. (2009). You don't have to believe everything you read: Background knowledge permits fast and efficient validation of information. *Journal of Personality and Social Psychology, 96*, 538-598.
- Roediger, H. L. (1996). Memory illusions. *Journal of Memory and Language, 35*, 76-100.
- Roediger, H. L., Jacoby, J. D., & McDermott, K. B. (1996). Misinformation effects in recall: Creating false memories through repeated retrieval. *Journal of Memory and Language, 35*, 300-318.
- Sachs, J. S. (1967). Recognition memory for syntactic and semantic aspects of connected discourse. *Perception & Psychophysics, 2*, 437-442.
- Shaw, V. F. (1996). The cognitive processes in informal reasoning. *Thinking & Reasoning, 2*, 51-80.
- Stadtler, M., Scharrer, L., Brummernhenrich, B., & Bromme, R. (2013). Dealing with uncertainty: Readers' memory for and use of conflicting information from science texts as function of presentation format and source expertise. *Cognition and Instruction, 31*, 130-150.
- Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science, 359*, 1146-1151.
- Voss, J. F., Fincher-Kiefer, R., Wiley, J., & Silfies, L. N. (1993). On the processing of arguments. *Argumentation, 7*, 165-181.
- Wolfe, C. R., & Britt, M. A. (2008). The locus of the myside bias in written argumentation. *Thinking and Reasoning, 14*, 1-27.
- Wolfe, C. R., Britt, M. A., & Butler, J. A. (2009). Argumentation schema and the myside bias in written argumentation. *Written Communication, 26*, 183-209.