



Lewandowsky, S. (2020). The 'post-truth' world, misinformation, and information literacy: A perspective from cognitive science. In *Informed societies—why information literacy matters for citizenship, participation and democracy* (pp. 69-87). Facet Publishing.
<https://www.facetpublishing.co.uk/page/detail/informed-societies/?k=9781783304226#:~:text=This%20book%20explains%20how%20and,society%20and%20its%20democratic%20processes.>

Peer reviewed version

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Chapter 11

The 'Post-Truth' World, Misinformation, and Information Literacy: A Perspective From Cognitive Science

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— The Party told you to reject the evidence of your eyes and ears. It was their final, most essential command. (George Orwell, 1984)

— Just remember, what you're seeing and what you're reading is not what's happening. (Donald Trump, 24 July 2018)

Abstract

There has been increasing concern with the growing infusion of disinformation, or “fake news”, into public discourse. Fact checkers have reported that Donald Trump has been making more than 6 false or misleading statements every day during his term in office thus far. This chapter explores three questions that arise from this situation. (1) Is disregard for the truth really an acceptable hallmark of contemporary politics? If so, how is this possible and what factors contributed to this state of affairs? I review research that shows how among partisans, endorsement of a politician has become decoupled from his or her perceived veracity. This may reflect disenchantment with the current political system and its “elite.” (2) What are the political and psychological consequences of the “post-truth” world? I survey the many findings that suggest that, once acquired, misinformation “sticks” in memory and is difficult to dislodge. In addition to those direct consequences of misinformation, it has indirect fallouts that may undermine the democratic process. (3) What is the appropriate response to this situation? I review the difficulties associated with debunking misinformation and suggest instead that “inoculating” people against misinformation before it is presented is a more successful strategy. I contrast psychological approaches with the idea of “technocognition”, which blends findings from cognitive science with the design of information architectures that are more resilient to the spreading of misinformation.

Introduction

“Post-truth” was nominated word of the year by *Oxford* dictionaries in 2016, to describe “circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief” (<https://en.oxforddictionaries.com/word-of-the-year/word-of-the-year-2016>). A year later, *Collins* dictionaries declared “fake news” to be the next word of the year, to refer to “false, often sensational, information disseminated under the guise of news reporting” (<https://www.collinsdictionary.com/woty>). The concern with truth—or indeed its absence—was largely triggered by two political events in 2016 that had global ramifications and that arguably involved an unprecedented extent of deception and misinformation: The Brexit referendum in the U.K. and the election of Donald Trump in the U.S. During the Brexit referendum, the public’s “epistemic rights”—that is, their right to be adequately informed—were serially violated by the

British tabloids (Watson, 2018), and during the U.S. presidential campaign, independent fact checker *PolitiFact* judged 70% of all statements by Donald Trump to be false or mostly false.

At the time of this writing, in mid-2018, the events of 2016 have turned out to be harbingers of a continued concern with the truthfulness of public discourse. By May 2018, the *Washington Post* had collated more than 3,000 false or misleading claims that President Trump had made, barely 18 months into his term, for an average of nearly 6.5 false claims a day (Kessler, Rizzo, & Kelly, 2018). Breaking with long-standing practice, premier American newspapers such as the *New York Times* now routinely refer to Donald Trump’s “lies” rather than using more circumspect language such as referring to statements as “misleading” or “false.”

The president’s amply-demonstrated disregard for the truth has, however, incurred remarkably little political cost. According to the Rasmussen daily tracker poll (http://www.rasmussenreports.com/public_content/politics/trump_administration/prez_track_jul27), President Trump’s approval ratings in 2018 to date have been largely indistinguishable from former President Obama’s ratings during the equivalent period of his presidency. Among Republicans, Trump’s average weekly approval has been at 86% in 2018, compared to 35% on average among Democrats (<https://news.gallup.com/poll/203198/presidential-approval-ratings-donald-trump.aspx>).

This situation invites at least three questions: First, is disregard for the truth really an acceptable hallmark of contemporary politics? If so, how is this possible and what factors contributed to this state of affairs? Second, what are the political and psychological consequences of the “post-truth” world? Third, what is the appropriate response to this situation? I take up these questions in turn.

The political viability of disregard for the truth

Do voters really disregard the truthfulness of a candidate? Are they truly unconcerned with facts? Or do voters who support Donald Trump share his view that the media are “enemies of the people” that publish “fake news” (Pengelly, 2018), and that the president actually speaks the truth? If so, how can that belief be sustained in light of so much contrary evidence by independent fact checkers?¹

Corrections of falsehoods but not feelings

Several lines of evidence suggest that, at least in the U.S., partisan supporters of politicians do not link their voting intentions and favourability ratings to the perceived veracity of a candidate. In a recent experiment, conducted during the U.S. primary campaign in 2016, Briony Swire, Berinsky, Lewandowsky, and Ecker (2017) presented more than 2,000 online participants with statements made by Donald Trump on the campaign trail. Half the statements shown to participants were true (e.g., “the U.S. spent \$2 trillion on the war in Iraq”) and the other half consisted of false claims (e.g., “vaccines cause autism”). Participants indicated their belief in those statements on an 11-point scale

¹ There is some debate about whether non-partisan fact checking is reliable or even possible (Amazeen, 2015; Uscinski & Butler, 2013). Critics point to issues such as ambiguities in what constitutes a “fact” and an inevitable selection bias because fact checkers cannot cover all statements (Uscinski & Butler, 2013). I consider those issues to be valid concerns but they do not negate the fact that sometimes politicians make claims that are unequivocally incompatible with the available evidence and that can—and should—be identified as false.

(from “definitely false” to “definitely true”). Participants were then presented with corrections of the false statements and affirmations of the correct statements. On a subsequent test, belief ratings changed according to the information presented: all participants, including Trump supporters, believed statements less after they were identified as false, and they believed them more after they were affirmed as being correct. However, for Trump supporters there was no association between the extent to which they shifted their belief when a statement was corrected and their feelings for President Trump or their intention to vote for him. Thus, it seems that President Trump’s false claims did not matter to his supporters—at least they did not matter sufficiently to alter their feelings or voting intentions.

The same result was obtained in a study by B. Nyhan, Porter, Reifler, and Wood (2017) using a slightly different methodology. They presented participants with a single incorrect claim made by Donald Trump (about crime rates), which was followed by various different types of correction and a single belief rating. Trump supporters again showed that they were sensitive to the corrections, in comparison to a control condition that did not receive any correction. However, just as in the study by Briony Swire et al. (2017), the correction had no effect on participants’ favourability ratings of Donald Trump.

The basic pattern of results was replicated yet again in an as-yet unpublished study by my team, led by Briony Swire, in which we also included supporters of Bernie Sanders and used some of Sanders’ statements in addition to Donald Trump’s. Although the data contain some nuances, as a first approximation it is clear that Sanders supporters differed little from Trump supporters in their dissociation between perceptions of factual accuracy on the one hand, and support for their favoured candidate on the other.

These data leave us with a conundrum: on the one hand, recent research has shown that even partisans are sensitive to corrections of false statements by their favoured candidate. On the other hand, acceptance of those corrections and the ensuing appropriate belief adjustment appear to have no effect on partisans’ support for their favoured candidate. Several resolutions to this conundrum have been proposed.

Authenticity versus truthfulness

There is no doubt that partisanship affects information processing in a large number of ways (for an overview, see, e.g., Bavel & Pereira, 2018). Arguably, those effects reflect the trade-off between the rewards that are offered by a strong partisan identity and those offered by being concerned with accuracy or truth. Specifically, by identifying strongly with a political party, people can satisfy a variety of needs and social goals—such as a sense of belonging (Jost, 2017), generating a sense of certainty or “closure” (Kruglanski & Webster, 1996), or having a platform to exercise their moral values (Tetlock, 2003). If fulfillment of those goals is valued more strongly than achieving accuracy or truthfulness, then people may act in ways that are seemingly at odds with indisputable facts.

A particularly striking example of such behaviour was observed in a recent study by Schaffner and Luks (2018), who presented participants with two side-by-side photographs of the inaugurations of Barack Obama in 2009 and Donald Trump in 2017. In the condition of greatest interest here, the photographs were unlabelled and participants were asked to choose the photo that had more people

in it. There is no doubt that far more people attended Obama’s inauguration than Trump’s (in addition to the photos taken from the Washington monument by the U.S. National Parks Service, ridership of the D.C. Metro by 11 am on Trump’s inauguration day was the lowest for any inauguration since 2005).

Schaffner and Luks (2018) found that among non-voters and Clinton voters, 3% and 2% of respondents, respectively, chose the incorrect picture (i.e., the picture from Trump’s inauguration with far fewer people). Among Trump voters, this proportion was 15%. When the data were broken down further by level of education of respondents, the error rate rose to 26% among highly-educated Trump voters, compared to 1% for highly-educated Clinton voters. For participants with low education, the gap between Trump (11%) and Clinton (2%) voters was considerably smaller. Given that inauguration attendance had become a matter of controversy at the time the study was conducted, with Trump’s press secretary claiming that it was “the largest audience ever to witness an inauguration—period—both in person and around the globe,” the results of Schaffner and Luks (2018) identify an instance in which people’s partisan identity trumped clear and unambiguous perceptual evidence.

Lest one think that this is an isolated instance, an NBC poll conducted in April 2018 revealed that 76% of Republicans thought that President Trump tells the truth “all or most of the time” (<https://www.nbcnews.com/politics/politics-news/poll-republicans-who-think-trump-untruthful-still-approve-him-n870521>). By contrast, only 5% of Democrats held that view. Clearly, partisanship is a major determinant of people’s views of truthfulness, what counts as facts, and even their own perceptions of photographs.

However, I argue that partisanship by itself is insufficient to explain people’s tolerance for dishonesty or their willingness to distrust their own eyes. In a recent, as yet unpublished, study conducted in Australia by my team led by Ullrich Ecker at the University of Western Australia, we found that Australian partisans *did* adjust their feelings about their favoured politicians when confronted with evidence for their lack of truthfulness. What, then, explains American partisans’ willingness to dissociate their preferences for politicians from their truthfulness?

A recent set of studies helps shed light on this question. Hahl, Kim, and Sivan (2018) proposed that flagrant lies may actually *enhance* the appeal of a “lying demagogue” when those lies are perceived as violations of norms—such as truth-telling—that are associated with a political system whose legitimacy is in question. That is, people who feel that the political system is in a crisis of legitimacy will consider *any* norm violation by a politician as a mark of his or her authenticity. Thus, the more blatantly Donald Trump is lying, the more his supporters may consider him to be their authentic champion, simply because blatant lies are considered unacceptable by the “establishment.”²

² By a similar process, education may also be devalued when it is seen as an attribute of the “establishment.” In a recent Pew poll, the majority of Republicans, by a 58% to 36% margin, considered colleges and universities to have a *negative* effect on the way things are going in the country (<http://www.pewresearch.org/fact-tank/2017/07/20/republicans-skeptical-of-colleges-impact-on-u-s-but-most-see-benefits-for-workforce-preparation/>). Among Democrats, the opinion was split the other way by a 72% (positive) to 19% (negative) margin.

Hahl et al. (2018) supported their argument with two studies in which participants were presented with brief vignettes pertaining to a (fictitious) election to a student government. In one condition, participants were led to believe that the student government was subject to a crisis of legitimacy by being told that “the student government president often meets with college administrators and board members” and that a scheduled debate “would be unfair, since the moderator was an administrator and knew one of the candidates”. In another condition this information was replaced by positive comments about the student government. Participants were then provided with more information about the campaign, which either identified one of the candidates as telling a flagrant lie or telling the truth. Participants judged the “lying demagogue” candidate to be more authentic than the honest candidate in the condition in which the student government was painted as being in a crisis of legitimacy. Conversely, when no crisis was perceived, the “lying demagogue” was judged to be *less* authentic than the honest candidate.

Crucially, these results were confined to those participants who were led to sympathize with the candidate in question by considering him to be a member of the same outgroup as the participant. Participants who were not led to sympathize with the candidate never considered him to be authentic. Hahl et al. (2018) thus identified two components that must be present before liars can be considered authentic: first, partisanship, and second, a shared sense of grievance caused by a crisis of legitimacy. Each factor on its own is insufficient to create the perception of authenticity when a political candidate is flagrantly violating the truth.

The consequences of “post-truth” politics

It is a truism that a functioning democracy relies on a well-informed populace. Widespread misinformation can engender collective preferences very different from those that would be observed if people were not misinformed (Kuklinski, Quirk, Jerit, Schwieder, & Rich, 2000). The issues and processes just reviewed therefore cannot be without adverse consequences for individuals and society as a whole.

Misinformation and the individual

Misinformation sticks. Erasing “fake news” from one’s memory is a challenging task, even under the best of circumstances; that is, in the psychological laboratory when participants are motivated to be accurate and are free from distraction (for a review, see S. Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012). When circumstances are less than ideal, the persistence of misinformation can take on epic proportions. To illustrate, consider the mythical Weapons of Mass Destruction (WMDs) that were alleged to be in Iraq and that were cited as the reason for the invasion of 2003. The constant drumbeat of “WMD, WMD, WMD” in the media and among politicians in the lead-up to the invasion, followed by innumerable media reports of “preliminary tests” that tested positive for chemical weapons during the early stages of the conflict—but ultimately were never confirmed by more thorough follow-up tests—created a powerful impression that those weapons had been discovered. The impression was so powerful that notable segments of the American public continued to believe, for up to a decade after the absence of WMDs had become the bipartisan official U.S. position, either that the U.S. had found WMDs in Iraq or that Iraq had hidden the weapons so well that they escaped detection. Jacobson (2010) reviewed polling data from 2006 through 2009 and found that around 60% of Republicans (and around 20% of Democrats) believed in the existence of

Iraqi WMDs, with little evidence of a decline of those false beliefs over time. A poll from December 2014 pegged erroneous beliefs in WMDs at 51% for Republicans and 32% for Democrats (<https://view2.fdu.edu/publicmind/2017/>), confirming the longevity of those false beliefs.

A particularly concerning aspect of the psychology of misinformation is that it can stick in people's memory even when they acknowledge a correction, and even when people *know* that a piece of information is false. This “continued influence effect” of misinformation has been demonstrated innumerable times (Chan, Jones, Jamieson, & Albarracín, 2017; S. Lewandowsky et al., 2012; B. Swire & Ecker, 2017), including in the context of the Iraq war. In a study conducted during the initial stages of the invasion of Iraq, colleagues and I presented participants with specific war-related items from the news media, some of which had been subsequently corrected, and asked for ratings of belief as well as memory for the original information and its correction (Lewandowsky, Stritzke, Oberauer, & Morales, 2005). We found that among U.S. participants, even those individuals who were certain that the information had been retracted continued to believe it to be true. This dissociation between overt statements of disbelief or acknowledgement of a correction on the one hand, and the continued reliance on the incorrect information on the other, is what makes misinformation so pernicious. I discussed the study by Briony Swire et al. (2017) at the outset, where we showed that Trump partisans are able to adjust their explicit belief in a claim by Donald Trump in response to a correction, but that those corrections had no effect on their feelings for the candidate. It turns out that even with material that is less politically charged (e.g., a story about a fictitious warehouse fire; Ecker, Lewandowsky, Swire, & Chang, 2011; H. M. Johnson & Seifert, 1994; Wilkes & Leatherbarrow, 1988), this dissociation can be observed. An overt acknowledgement by participants that they have received a correction does not preclude their reliance on information they now know to be false when subsequently drawing inferences.

Misinformation and society

It requires little imagination to realize that misinformed individuals are unlikely to make optimal decisions, and that even putting aside one's political preferences, this can have adverse consequences for society as a whole. For example, following the unsubstantiated—and now thoroughly debunked (DeStefano & Thompson, 2004; Godlee, Smith, & Marcovitch, 2011)—claim of a link between childhood vaccinations and autism, numerous parents (largely in the U.K.) decided not to immunize their children. These misinformation-driven choices led to a marked increase in vaccine-preventable diseases, and substantial effort and expenditure were required to resolve this public-health crisis (Larson, Cooper, Eskola, Katz, & Ratzan, 2011; Poland & Spier, 2010).

The toxic fallout from misinformation is not limited to those direct consequences. Other more insidious fallouts may involve people's reluctance to believe in facts altogether. There have been numerous demonstrations that the presence of misinformation undermines the effects of accurate information. Van der Linden, Leiserowitz, Rosenthal, and Maibach (2017) showed that when participants were presented with both a persuasive fact and a related piece of misinformation, belief overall was unaffected—the misinformation cancelled out the fact. McCright, Charters, Dentzman, and Dietz (2016) found that the presence of a contrarian counter frame cancelled out valid climate information, and the same effect was also observed by Cook, Lewandowsky, and Ecker (2017).

The insidious fallout from misinformation is particularly pronounced when the misinformation is packaged as a conspiracy theory. There have been repeated demonstrations that exposure to conspiratorial discourse, even if the claims are dismissed, makes people less likely to accept official information (Einstein & Glick, 2015; Jolley & Douglas (2013); Raab, Auer, Ortlieb, & Carbon, 2013). To illustrate, in one study exposure to a conspiracy claim—namely, that the U.S. Bureau of Labor Statistics manipulated unemployment data for political reasons—adversely affected trust in government services and institutions, including those *unconnected* to the conspiratorial allegations (Einstein & Glick, 2015).

Misinformation does not just misinform. It also undermines democracy by calling into question the knowability of information altogether. And without knowable information deliberative democratic discourse is called into question (for an elaboration of those concerns, see Lewandowsky, Ecker, & Cook, 2017). Fortunately, we are not entirely powerless in confronting the “post-truth” malaise.

Recovering from the “post-truth” world

The political context

Science sometimes cannot help but be political, at least in the eyes of some stakeholders: for example, when medical researchers determine that smoking causes lung cancer, public reporting of their results is likely to create political fallout. When climate scientists alerted the world to the risks from greenhouse gas emissions, the political fallout echoed around the world and continues to do so decades later. Likewise, any researcher on misinformation will sooner or later encounter political fallout from their work. I argue that the political context and implications of misinformation must be understood and considered by researchers (for details, see Lewandowsky et al., 2017).

In particular, it must be borne in mind that disinformation is not a coincidental by-product of some other activity but is, usually, disseminated by political actors for a specific purpose. That is, much like climate denial (Lewandowsky, Cook, & Lloyd, 2016), “post-truth” politics is best considered a rational strategy that is deployed in pursuit of political objectives. By implication, post-truth politics may cease when its effectiveness is curtailed by a change in the political environment.

Although effecting that political change is beyond the purview of cognitive science, researchers can contribute to the process in various ways. One particularly intriguing example is a field experiment conducted on U.S. state legislators by Nyhan and Reifler (2015). They randomly assigned incumbents to one of two groups before the 2012 election. One group was sent letters outlining the risks to their reputation and re-election chances if they were caught making statements of questionable accuracy. The other group was sent letters indicating merely that research on politicians’ accuracy was being conducted without specifying any details. The group that was alerted to the reputational costs on inaccuracy was substantially less likely to receive negative ratings from fact-checkers. It appears that state-level politicians are quite sensitive to the reputational impact of inaccuracies (or at least they were in 2012).

Similarly, there is at least preliminary evidence that issuing a public commitment to honest conduct, known as the “Pro-Truth Pledge” (Tsipursky, Votta, & Mulick, 2018), is effective in enhancing the integrity of conduct of the signatories. Anecdotal evidence suggests that some of the signatories who are politicians, publicly corrected their own social-media postings when alerted to inaccuracies after

taking the Pledge. In a further small-scale analysis of the Facebook posts of 20 signatories, a significant increase in the accuracy of posted content was observed after the Pledge had been taken (Tsipursky, Votta, & Roose, 2018).

Cognitive scientists (myself included) have also contributed to a 2018 report by the U.K. House of Common’s Digital, Culture, Media and Sport Committee that investigated “fake news” (<https://publications.parliament.uk/pa/cm201719/cmselect/cmcomeds/363/363.pdf>). The report drew the headline conclusion that tech companies should be held liable for use of “harmful and misleading material” on their sites.

In summary, the large-scale dissemination of misinformation is political, and hence the solution must also be largely political. There are indications that at least some political actors are sensitive to the reputational costs incurred by inaccurate statements, and are willing to express a commitment to greater accuracy. Nonetheless, even within this larger context, it is important to understand how individuals’ cognitive systems respond to debunking of misinformation.

Debunking of misinformation

There is broad agreement in the literature that corrections of misinformation are successful only if the correction is accompanied by an alternative explanation, or if suspicion is aroused over the initial source of the misinformation. That is, telling people that negligence was *not* a factor in a story about a fictitious warehouse fire (after negligence was first implied) is insufficient for them to dismiss that information. Telling people instead that arson, rather than negligence, was to blame for the fire, successfully eliminates reliance on the initial misinformation (e.g., Ecker, Lewandowsky, & Tang, 2010; Ecker, Lewandowsky, Cheung, & Maybery, 2015; H. M. Johnson & Seifert, 1994).

If a causal alternative is not available—as, for example, when attempting to rebut conspiracy theories about the disappearance of Malaysian Airlines flight MH370 over the Indian Ocean—arousing suspicion about the source of misinformation may be another technique to achieve debunking. For example, when mock jurors are admonished to disregard tainted evidence presented as part of a mock trial when reaching a verdict, they demonstrably continue to rely on that tainted evidence. The reliance occurs even though jurors indicate that they disregarded the evidence. Reliance disappears only when jurors are made suspicious of the motives underlying the dissemination of the tainted evidence in the first place, for example because it may have been planted by the prosecutor’s office (Fein, McCloskey, & Tomlinson, 1997). These difficulties associated with debunking can be circumvented if people are made aware of misinformation *before* it is presented or if they can acquire generic skills that enable them to filter out disinformation.

Inoculation and information literacy

There is growing evidence that people can avoid being misled if they are warned that they might be misinformed or if their attention is drawn to particular techniques by which they might be misled (Cook et al., 2017; Ecker et al., 2010; van der Linden et al., 2017). This process is known as “inoculation” or “prebunking” and it was summarized by Cook et al. (2017) (p. 4) as follows:

There are two elements to an inoculation: (1) an explicit warning of an impending threat and (2) a refutation of an anticipated argument that exposes the imminent

fallacy. For example, an inoculation might include (1) a warning that there exist attempts to cast doubt on the scientific consensus regarding climate change, and (2) an explanation that one technique employed is the rhetorical use of a large group of “fake experts” to feign a lack of consensus. By exposing the fallacy, the misinformation (in this case, the feigned lack of consensus) is delivered in a “weakened” form. Thus, when people subsequently encounter a deceptive argument, the inoculation provides them with a counter-argument to immediately dismiss the misinformation.

The success of inoculation has been established in several experiments (Cook et al., 2017; van der Linden et al., 2017). To illustrate with an example from climate change, our team showed that people can be inoculated against disinformation efforts by climate deniers by presenting participants with (1) a warning that attempts are made to cast doubt on the scientific consensus for political reasons, and (2) an explanation that one disinformation technique involves appeals to dissenting “fake experts” to feign a lack of scientific consensus. We illustrated the “fake-expert” approach by drawing attention to the historical attempts of the tobacco industry to undermine the medical consensus about the health risks from smoking with advertising claims such as “20,679 Physicians say ‘Luckies are less irritating’”. By exposing the fake-expert disinformation strategy at the outset, the subsequent misinformation (in this case, the feigned lack of scientific consensus on climate change) was defanged and people’s responses to various climate-related test items did not differ from a control condition that received no misinformation about the consensus. By contrast, in the absence of inoculation, the misinformation involving “fake experts” had a discernible detrimental effect. Misinformation sticks and is hard to dislodge. But we can prevent it from sticking in the first place by alerting people to how they might be misled.

In a slightly different context, Merpert, Furman, Anauati, Zommer, and Taylor (2018) showed that members of the can be readily trained to identify statements in a politician’s speech that could, in principle, be subject to fact checking. This is an important skill because opinions, by definition, are not subject to fact checking, and differentiation of opinions from factual assertions is therefore a necessary first step before fact-checking of suitable items can commence.

Available research indicates that there *is* a path towards educating the public about post-truth discourse. However, that path is filled with pitfalls and, by itself, cannot overcome the “post-truth” malaise. An alternative approach therefore goes beyond cognitive science and seeks to incorporate technological solutions.

Technocognition

This approach has been labeled “technocognition” (Lewandowsky et al., 2017) and invites an interdisciplinary approach to the design of information architectures. Core to the approach is the incorporation of principles borrowed from behavioral economics to “nudge” (Thaler & Sunstein, 2008) people against spreading of misinformation by designing better information architectures. To illustrate with an example from behavioural economics, organ donation rates have been shown to quintuple by merely changing the default; that is, moving from “opt-in” to an “opt-out” system (E. J. Johnson & Goldstein, 2003). I argue that similar principles could apply to information technology, and there are some recent pointers in that direction.

To illustrate, reader comments on online articles and posts are known to affect other readers' impressions and behavioural intentions (Lee, 2012; Stavrositu & Kim, 2015; Winter & Krämer, 2016). The mere tone of blog comments can affect people's attitudes towards scientific issues they do not understand well: uncivil comments have been shown to polarize readers' views on nanotechnology (Anderson, Brossard, Scheufele, Xenos, & Ladwig, 2013). The recognition that blog comments can have toxic consequences is of growing concern to internet information providers. One particularly innovative response to this problem was launched by the Norwegian broadcaster NRK. The NRK experimented with the requirement that readers must pass a brief comprehension quiz before being permitted to post comments (<http://www.niemanlab.org/2017/03/this-site-is-taking-the-edge-off-rant-mode-by-making-readers-pass-a-quiz-before-commenting/>). This simple measure cannot help but eliminate uninformed comments and it may also serve to deter "trolls" who are unlikely to expend the effort necessary to overcome this threshold for involvement. Crucially, no one is censored in the process because once the quiz has been passed, people are free to comment as per usual.

Other possible avenues for exploration involve redesign—or at least re-evaluation—of recommender systems. Recommender systems have become an unavoidable and constant companion in our lives. For example, whenever we watch a YouTube video, the experience will be accompanied by a panel of thumbnails that is providing us with further movies to choose from. Those suggestions are far from random but are customized on the basis of our viewing history and, possibly, other variables that we are unaware of. There is no evidence that consumers know how recommender systems operate, and to date these highly sophisticated tools have flourished without much legislative supervision or constraint (though see Ricci, Rokach, & Shapira, 2015, for some pointers to discussion of regulations).

There is evidence that the YouTube recommender system, for example, can lead users to become immersed in an ideological bubble in a few clicks once they have watched a single extremist video and then follow YouTube's recommendations (O'Callaghan, Greene, Conway, Carthy, & Cunningham, 2015). A particularly troubling implication of the YouTube recommender system is that *counter-extremist* messages, deployed (e.g., by educational institutions) with the intent to inoculate users *against* extremist messages, may inadvertently draw viewers further into extremist content (Schmitt, Rieger, Rutkowski, & Ernst, 2018). Because YouTube's recommendations favour highly-active channels, extremist content—known to be produced at a rapid pace—is likely to be ranked ahead of counter-extremist messages that take more time to produce (Bartlett & Krasodomski-Jones, 2015).

Fortunately, these problems constitute only one side of the coin: there is also evidence that algorithmic correction of misinformation shows promise (Bode & Vraga, 2015). Likewise, in at least one instance common recommender-system algorithms have been shown to yield at least as much diversity of recommended news content as the human editors of a quality newspaper (Möller, Trilling, Helberger, & van Es, 2018). A debate about how diversity can be achieved as a design principle of recommender systems has commenced in the literature (Helberger, Karppinen, & D'Acunto, 2018), and in my view those discussions will bear fruit in the near future. I mentioned at the outset how the misinformation disseminated by the Leave campaign during the Brexit referendum violated people's epistemic rights (Watson, 2018). It is notable that similar arguments

have been made outside any specific context or event about personalization more generally. Based on analysis of case law of the European Court of Human Rights, Eskens, Helberger, and Moeller (2017) argued that news personalization, per se, may impinge on people's right to receive information.

Conclusion

We live in an environment that is drenched in misinformation, “fake news”, and propaganda not because of an unavoidable accident but because it has been created by political actors in pursuit of political and economic objectives. We therefore do not face a natural disaster but a political problem. On the positive side, this implies that, unlike for earthquakes or tsunamis, a solution is likely to exist and ought to be achievable. On the negative side, it means that the solution is unlikely to involve more (or better) communication alone. As Brulle, Carmichael, and Jenkins (2012) noted in the context of climate change, “introducing new messages or information into an otherwise unchanged socioeconomic system will accomplish little” (p. 185).

Post-truth politics is a tool in a struggle for power and over the nature of liberal democracies, and communication alone cannot resolve such deep-seated political conflicts. Instead, their resolution requires political mobilization and public activism (Brulle et al., 2012). The contribution from cognitive science is therefore limited to highlighting how people's thinking and acting might facilitate or hinder such mobilization.

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