10

Post-truth, anti-truth, and can’t-handle-the-truth: how responses to science are shaped by concerns about its impact

Robbie M. Sutton, Aino Petterson, and Bastiaan T. Rutjens

Introduction

> Science is the great antidote to the poison of enthusiasm and superstition.
>
> —Adam Smith, *The Wealth of Nations*, 1776

> Science is always wrong. It never solves a problem without creating ten more.
>
> —George Bernard Shaw

People generally report positive attitudes to science and scientists (Gauchat, 2012). It is valued for the contribution that it makes to social, cultural, and economic progress. For many people, indeed, faith in science is akin to religious faith and may serve some of the same psychological functions (Rutjens, van Harreveld, & van der Pligt, 2013). Science is supported by investments of large sums of money; according to World Bank statistics, fully 2% of global gross domestic product (GDP) is spent on research and development, and the richer the country, the higher this proportion grows (The World Bank, 2018). But, paradoxically, science is also frequently opposed: scientific findings and conclusions are censored and suppressed, whereas scientists are silenced, harassed, surveilled, sanctioned, and even persecuted.

Examples abound. Columbia University now hosts a website containing multiple instances (since November 2016) in which authorities have censored, obstructed, or misrepresented scientific research – and where scientists have censored their own work or that of their colleagues (Columbia Law School, 2018). Just as happened with the election of Steven Harper in Canada (The Professional Institute of the Public Service of Canada, 2013), the censorial and obstructive policy position toward climate science in the United States seems to have stemmed from the election of Donald J. Trump and his appointment of Scott Pruitt, a vocal critic of climate science and frequent litigator against the Environmental Protection Agency (EPA) as the head of that same agency (Chiacu & Volcovici, 2017; McKie, 2017; Nuccitelli, 2017). Also in 2017, the Turkish government completely removed evolution from the curriculum of 9th graders, with the explicit aim of introducing a more "value-based curriculum" (Frayer & Saracoglu, 2017). In recent years, prominent scientists have complained about being targeted by online abuse, legal complaints, vexatious and repeated freedom of information requests, and dubious re-analyses of data designed to delay, censor, and alter the interpretation of published findings. These findings span not only climate change but also other controversial topics such as false memory and child abuse (Lewandowsky, Mann, Bauld, Hastings, & Loftus, 2013; Lewandowsky, Mann, Brown, & Friedman, 2016). Indeed, opposition to science is not the preserve of right-wing and religious groups. Whatever the scientific merits of Herrnstein and Murray's research on racial differences in IQ, it has been described in published academic papers as "crude and dangerous" (Gillborn, 2016, p. 365) and has been silenced by no-platform and other aggressive tactics on university campuses (Beinart, 2017), echoing the campus attacks on Edward O. Wilson in the 1960s (Wilson, 1995). Of course, the perception that scientific research can be dangerous and needs to be silenced and shut down is not new, and stems back (at least) to the persecution of Galileo

Galilei, whose frank observations of planetary movements threatened the view that the earth is the center of the cosmos – and by implication, an entire edifice of theology and power (Dreger, 2015).

What explains this perennial opposition to science? There is surprisingly little research on this question, despite a long and strong tradition of research into motivated skepticism about scientific findings (for reviews, see Hornsey & Fielding, 2017; Rutjens, Heine, Sutton, & van Harreveld, 2018). There is an urgent need for such research because opposition to science threatens scientific, and therefore social and economic progress, and appears to be gathering pace in an era of declining support for democratic and enlightenment values. To be sure, motivated skepticism about science is an important phenomenon: for example, it causes people to leave themselves and their children unprotected from preventable diseases and encourages them to make personal and political choices that degrade the environment (Rutjens et al., 2018). But as much as motivated skepticism matters, it has no chance to operate when scientific advances are censored or prevented from happening in the first place. Nor, in this case, does anyone have the opportunity to make choices informed by their own reading of the evidence. Thus, people's preferences for policies that support versus oppose science may be at least as important as their attitudes toward science itself.

In this chapter, we outline some preliminary theoretical and empirical groundwork for the systematic study of opposition to science. Our core proposal is that people not only doubt the facts produced by some scientific investigations but that they also perceive them as a threat to collective interests. In turn, this perception motivates cognitive and behavioral responses that serve to neutralize the threat. Such responses include motivated skepticism since findings are less likely to have impact if they are not believed. They also include motivated opposition to science

since findings are less likely to have impact if they remain obscure, are prevented from informing policy, or from happening at all.

Why science seems dangerous

We suggest that science seems dangerous because it is designed to disrupt the constraints of other methods of establishing and sharing knowledge. Communication is normally governed by conventions designed to preserve social relationships, including harmony and hierarchy. Although politeness takes different forms in different cultures, politeness itself is pancultural, and in every culture, it mandates that one should be more formal and less frank with strangers and social superiors (Brown & Gilman, 1960). One of the main aims of normal communication is to establish a common ground of understanding between communicators (Clark, 1992), and ultimately, a shared cultural reality within a cultural ingroup (Echterhoff, Higgins, & Levine, 2009). Thus, people tend to inhibit the expression of ideas that deviate from normative understandings of reality (e.g. Kashima, 2000a, 2000b; Toma & Butera, 2009) and react negatively when these ideas are shared too openly. For instance, Klar and Bilewicz (2017; see also Bilewicz, 2016) found that group members' belief in the accuracy of their ingroup's historical narrative motivates individuals to act as lay censors of historical accounts that run counter to this "official" account. People also inhibit other ideas out of paternalistic concern for the harm they may do to their audience. Thus, we are normally expected to refrain from telling people exactly what it is about their intellect, appearance, or character that we find unattractive. Hate speech is explicitly banned in many countries and frowned upon in most others. Research on the third-person effect (Davison, 1983) shows that in the domain of mass communication, people perceive that advertising, pornography, and propaganda may exert an undesirable influence on others, if not themselves. The more they perceive it to harm others, the more they

support censorship of this material (Chung & Moon, 2016; Davison, 1983; Douglas & Sutton, 2004, 2008).

If normal human communication is polite and strategically economical with the truth, science in its ideal form is supposed to be impersonal and mercilessly frank. Put differently, perceptions of reality should be dictated by science in its ideal form, rather than perceptions of reality shaping which science to accept and which to reject. Results should be reported regardless of what people generally believe or prefer to believe, and no matter what their implications for social harmony and hierarchy. Instead of carefully editing their message to suit their own or others' interests, researchers hand over control of their message to the vicissitudes of their data. The studies they conduct are rolls of the dice, and like oracles or soothsayers (a Middle English term, first recorded in Kent, which means one who speaks the truth), they are formally obliged to convey the results.

Freeing science from the conventions of ordinary communication has been crucial to its success in freeing our understanding of the world from the shackles of prejudice and superstition. But science is not completely free, and its freedom is viewed with suspicion and resentment. Indeed, popular representations of science often cast it as dangerous, immoral, or pernicious (see Rutjens & Heine, 2016). Haynes (2003) examined cultural representations of scientists in Western literature and film, and identified several pernicious stereotypes. Frankenstein is an example of an "inhuman researcher" who puts aside normal human emotions such as empathy in the single-minded pursuit of knowledge and mastery of nature. In other works, scientists are represented as "foolish" and "helpless" – unduly ready to make far-reaching decisions on the basis of a few scientific observations and unable to predict or control their inventions. In *Jurassic Park*, genetically engineered dinosaurs run amok, much to the surprise and chagrin of the scientists

who created them; in *Terminator*, the same is true of an artificially intelligent defense system that becomes sentient. Scientists are also sometimes represented straightforwardly as "mad, bad, and dangerous" (dangerous in particular still resonates with public opinion; Rutjens & Heine, 2016), like the nuclear scientist Dr Strangelove in Stanley Kubrick's film.

We suggest that motivated doubt and opposition to science are best understood within a *social functionalist* perspective on motivated cognition (Tetlock, 2002). This theoretical perspective, like other accounts of motivated cognition, assumes that when people think, feel, and act, they are pursuing goals – in other words, that human psychology should be understood in functionalist terms. However, other accounts of motivated cognition are concerned with essentially intrapsychic functions: people's thoughts, feelings, and actions are designed to make them feel better about themselves, that they are in control of the world, or that they have a stable working understanding of reality (Kruglanski, 1990; Kunda, 1990; Landau, Kay, & Whitson, 2015). Research on attitudes to science has, thus far, concerned itself largely with intrapsychic motives, for example on how people are skeptical of scientific research when it contradicts their beliefs about a topic (Lord, Ross, & Lepper, 1979) or threatens their self-image (Bastardi, Uhlmann, & Ross, 2011), their sense of personal optimism (Ditto & Lopez, 1992) or their moral (Colombo, Bucher, & Inbar, 2016) and ideological (Washburn & Skitka, 2017) convictions. In contrast, Tetlock's (2002) social functionalist account is concerned with the "social functions of thought," and posits that motivated cognition can be understood only in terms of the "embeddedness of human beings in relations with other people, institutions, and the broader political and cultural environment" [35: p. 452]. This perspective assumes that the pursuit of collective goals, including social order, requires people to think, feel, and act in certain ways – ways that enable them to cope effectively with the demands of living in complex interdependent

collectives. These demands include the ability to hold others accountable for actions that may threaten collective interests, and to cope with being held accountable by others. Note that the distinction made between intrapsychic motives and Tetlock's social functionalist account is not definite since any ideological or morality-based motivations likely incorporate both (e.g. Washburn & Skitka, 2017), and these are often difficult to tease apart (Tetlock & Manstead, 1985). Nonetheless, most work on attitudes to science, and especially the classic work, was informed by cognitive consistency accounts of confirmation bias (e.g. Lord et al., 1979), with limited attention devoted to the wider social functions of this bias.

Within this overarching perspective, Tetlock (2002) proposed three theoretical models detailing ways in which social functionalism plays out. People function as *intuitive theologians*, defending sacred values such as shared moral foundations, ideological assumptions, and binding myths from ideas and evidence that contradict them. Data and ideas that contradict these sacred values, which might include egalitarian ideals about racial equality or fundamentalist beliefs about the incontrovertible truth of the Bible, are rejected. When people's concerns about the potential impact of research lead them to cast doubts on its veracity and to support censorship, they are acting as intuitive theologians. Second, people function as *intuitive prosecutors*, defending rules and regimes that they perceive as legitimate. This includes finding blame and supporting efforts to punish those who pose a threat to these regimes. When people oppose research by favoring censorship, defunding, and sanctions, they are acting as intuitive prosecutors. Third, when their own actions may be under the spotlight, they function as *intuitive politicians*, and think, feel, and act in ways that protect and enhance desired impressions of themselves. People may do this by appealing to cherry-picked scientific findings that support their chosen attitude or policy position while casting doubt on other findings.

Note that scientists and their work are not passive in these processes. Social functionalism is a ubiquitous feature of social cognition and motivation and is also displayed by scientists themselves. Researchers function as intuitive politicians when they selectively pursue research questions, choose methods, and report results to avoid controversy or accrue available rewards (Ioannidis, 2012; but see also Nosek et al., 2015). They act as intuitive prosecutors when they call out fellow researchers who produce work that they perceive as potentially harmful (e.g. Dominus, 2017). In such cases, the concern is generally not paternalistic concern for impacts on the public, or concern about dangerous technologies, but harms to the integrity of the scientific community and its members (e.g. the misdirection of theory and effort by inauthentic findings). They act as intuitive theologians when their moral and political preferences affect their selection of research questions, methods, analyses, and interpretations (Duarte et al., 2015; Jussim, Crawford, Anglin, Stevens, & Duarte, 2016). Indeed, Jussim, Stevens, and Honeycutt (2018; see also Stevens, Jussim, Anglin, & Honeycutt, 2018) argued that many questions concerning the accuracy of stereotypes remain unasked in part because researchers fear the negative impact that certain findings could have on stigmatized groups.

Impact, science skepticism, and censorial responses to science

Viewed from a social functionalist perspective, skepticism and opposition to research are motivated by concerns about the potential impact of scientific findings on collective interests. Studies should show, therefore, that this concern affects responses to scientific research over and above the effect of intrapsychic motivations such as the confirmation bias. We (Sutton, Lee, and Hartley, 2018) put this hypothesis to the test in the context of pregnant women's alcohol consumption during pregnancy. Although there is some evidence that high levels of prenatal alcohol exposure are associated with risks to children's cognitive development (Flak et al., 2014;

but see also Henderson, Kesmodel, & Gray, 2007), meta-analytic studies have found no harmful effects of low or moderate levels (Flak et al., 2014; Henderson, Gray, & Brocklehurst, 2007). Some studies even show the opposite trend: children who have been exposed to low or moderate levels of alcohol during pregnancy demonstrate higher intelligence later compared to those who had no prenatal alcohol exposure (Humphriss, Hall, May, Zuccolo, & Macleod, 2013; Lewis et al., 2012). Nonetheless, public opinion flies in the face of this evidence: there appears to be a consensus that exposure to even small amounts of alcohol during pregnancy poses a risk to a child's cognitive development (Murphy, Sutton, Douglas, & McClellan, 2011).

As we shall see below, this might be understood partly as a result of biased and censorious coverage of relevant science in the media (Lowe, Lee, & Yardley, 2010), and in advice and communiques issued by official agencies who are explicitly concerned that women do not become confused about how much might be safe to consume (Gavaghan, 2009). Thus, the departure of public opinion from the evidence may not reflect the operation of psychological mechanisms. Sutton, Lee and Hartley (2018), however, also examined whether impact bias might motivate skepticism even when people are exposed to accurate coverage of scientific findings. We presented experimental groups of participants with the results of a (real) cohort study (Lewis et al., 2012) that found 8-year-old children had significantly higher IQs if their mothers had consumed low-to-moderate amounts of alcohol during pregnancy (vs. if they had abstained completely from alcohol). Control groups were presented with a fictional variant of the study in which milk, rather than alcohol, was the substance that mothers had consumed (Study 1), or in which the actual results of the study were reversed, indicating that children had lower IQs if their mothers drank moderately (Study 2).

Sutton, Lee, and Hartley (2018) found evidence of impact bias: as predicted, participants in the experimental groups systematically and consistently devalued the research. They perceived its methods and its results to be less reliable and convincing than did control participants. Crucially, participants also indicated that they thought the findings of the actual research (i.e. children whose mothers drank alcohol were more intelligent) would be bad for mothers, children, and society, whereas the fictional findings (drinking milk led to higher IQs or drinking alcohol lead to lower IQs) would be good for them (responses were significantly different from mid-point in contrasting directions). Results indicated that these perceptions of impact mediated the effect of the putative study results: participants saw the actual findings as more dangerous than the fictional findings, and subsequently were more skeptical of them. Perceptions of impact also appeared to mediate other interesting responses to the alcohol-during-pregnancy studies: people were less likely to interpret the actual effect in causal terms and were more likely to ascribe it to some confound (e.g. mothers who drank more were higher in socio-economic status – a finding actually observed in the original study by Lewis et al., 2012). These findings also held when prior beliefs about the effects of prenatal exposure to alcohol (or milk) on child IQ were adjusted for. These prior beliefs had a large effect consistent with the confirmation bias, but over and above this effect, perceptions of impact accounted for differential reactions to the research. Sutton et al.'s (2018) findings also indicate that as we have proposed, people are also motivated to adopt obstructive, censorial, and even punitive responses to science that they perceive as dangerous. In these studies, participants opposed the funding, dissemination, and application of studies showing that alcohol may be associated with higher child IQ. They also tended to show some desire to see the scientists responsible for the research to be disciplined. In contrast, on the same measures, they supported the fictional studies in which drinking milk led to higher child IQ

or drinking alcohol led to lower child IQ. Once more, these effects were mediated by the perceived impact of the research. Participants seemed motivated to protect society from dangerous scientific results by not only casting doubt on these results but also supporting measures to prevent similar results from seeing the light of day, including censorship and punishment of researchers.

Scientists are not merely censored by authorities but also censor their own work. This is especially apparent in studies that touch upon controversial topics such as climate change, where researchers are careful to manage their terminology and draw causal conclusions from their data to protect their funding (Hersher, 2017). Scientists report that fear of negative reactions both from the public and fellow researchers influence what they study and how they report findings (Kempner, Perlis, & Merz, 2005). Seen through Tetlock's (2002) social functionalist perspective, scientists therefore act as intuitive politicians, managing accountability demands by strategically presenting their work to the world.

Alcohol consumption during pregnancy is controversial topic surrounded, as we have seen, by concerns about the impact of the research. Lee, Sutton, and Hartley (2016) analyzed media coverage of Lewis et al.'s (2012) study into child intelligence and maternal drinking during pregnancy. Lee et al. (2016) found that the researchers played an important role in media misrepresentations of their work. One of its key and most incendiary findings – that mothers who drank some (vs. no) alcohol had more intelligent children – was reported in the article. However, Lewis et al. (2012) attributed this result to a socio-demographic confound (expectant mothers were less likely to abstain from alcohol if they were older, more educated, or higher income), despite running no analysis adjusting for this confound. More strikingly, the press release issued by the researchers' institution made no mention of this result (University of Bristol, 2012).

Instead, it contained a quote from the senior researcher to the effect that the study's results gave grounds for women not to drink during pregnancy. Only a third of the subsequent media stories mentioned the empirical relationship between maternal drinking and child intelligence, and of those, two-thirds reversed the direction of the effect, stating that mothers who abstained had less intelligent children. A near-universal theme in the coverage was that women should abstain from alcohol. These misrepresentations were not entirely media inventions but could be traced back to the scientific paper and especially the press release. Scientists commonly complain that their work is misrepresented because of the sensationalism, political agenda, and scientific illiteracy of media outlets. The analysis by Lee et al. illustrates that scientists may also be involved in misrepresenting their work.

Participants' responses to the target studies presented by Sutton, Lee and Hartley (2018) reflect a consensus that if these studies lead pregnant women to drink alcohol, this would be a bad outcome. In contrast, the value attached to other impacts of research may differ markedly across participants, which is in line with more general notions derived from work on the ideological-conflict hypothesis (Brandt et al., 2014). Liberals, for example, are likely to loathe the idea that a scientific finding could lend support to the death penalty, or undermine permissive immigration policies by indicating that immigration undermines neighborhood cohesion. Conservatives, in contrast, are likely to view both of these outcomes rather favorably.

McConnell and Sutton (2018) tested this possibility and examined whether these politically loaded perceptions of impact also produce impact bias effects. Similar to Washburn and Skitka (2017; see also Kahan, 2013; Skitka & Washburn, 2016), they showed that participants on both sides of the left-right political spectrum were skeptical of research that contradicted their views. In line with Sutton, Lee and Hartley (2018), they showed that this effect was mediated by the

perception that politically uncongenial findings could be harmful to society. Indeed, McConnell and Sutton (2018) observed the third-person effect in relation to politically uncongenial findings: liberals thought that conservative-friendly policies would have larger effects on others than themselves, and perceptions of impact on others, rather than the self, were related to skepticism. Furthermore, as observed by Sutton et al. (2018), McConnell and Sutton found that perceptions of harmful impacts also mediated between the political congeniality of research results and censorious and punitive responses to the research.

One limitation of these studies is that they use correlational methods to isolate the effects of perceived harmful consequences of research (impact bias) from effects of contradictions of prior beliefs (confirmation bias). It is possible, in principle, to manipulate perceived impact orthogonally to prior beliefs about a research topic. Campbell and Kay (2014) took such an approach in their study of politically motivated skepticism about climate science. It is well documented that conservatives tend to be more skeptical of climate science than liberals. This has been explained in terms of various motivations such as higher national- rather than global-level identification (Devine-Wright, Price, & Leviston, 2015), system justification (Hennes, Hampton, Ozgumus, & Hamor, 2018; see also Feygina, Jost, & Goldsmith, 2010), dominance motives (Jylhä, Cantal, Akrami, & Milfont, 2016), and endorsement of free-market ideology (Lewandowsky, Gignac, & Oberauer, 2013), but in line with the latter finding of Campbell and Kay (2014) suggested that it might be motivated by *solution aversion*: typically, measures proposed to mitigate climate change involve government intervention in the form of taxes and regulation. When Campbell and Kay (2014) presented free-market solutions to participants, in the form of private-sector innovations in energy technology, conservatives indicated no more skepticism about climate change than liberals. This finding indicates that concern about the

policy impact of climate science motivates climate skepticism: people doubt climate science if it looks like it will lead to unwanted policy outcomes.

Scientific malpractice and conspiracy

In their social functionalist role as intuitive prosecutors, people are more punitive toward harmdoers whose actions are intentional. Indeed, people prefer to perceive harmdoing as intentional insofar as it enables collectives to exert control over negative outcomes by blaming, punishing, and incapacitating wrongdoers (McClure, Hilton, & Sutton, 2007). This suggests that findings that are seen as dangerous are more likely to be seen as the product of intentional wrongdoing, rather than an innocent mistake or incompetence. It also suggests that once represented as intentional wrongdoing, science is much more likely to be opposed.

We have obtained preliminary evidence for both of these suggestions. McConnell and Sutton (2018) found that people on both the left and right sides of the political spectrum tended to perceive ideologically uncongenial results as the product of a conspiracy by researchers. In another line of work, we (Sutton, Douglas, & Petterson, 2018) found that after adjusting for skepticism about climate change, belief in conspiracy theories about climate science (e.g. that scientists exaggerate the danger of climate science to secure funding) predicted support for the censorship, surveillance, and punishment of climate scientists. In a subsequent experiment, we found that experimentally exposing participants to these conspiracy theories increased their opposition to climate science on the same measures.

Conspiracy theories explain socially significant phenomena as the outcome of covert plots, generally orchestrated by powerful elites to serve their own interests (Douglas, Sutton, & Cichocka, 2017). Conspiracy theories surround several topics of scientific inquiry, most famously vaccination and climate change. Conspiracy theories are widespread in the general

population, with over a third of Americans agreeing that “global warming is a hoax” in a recent survey (Jensen, 2013). Conspiracy theories about science are not a peculiarly American or conservative problem: Bessi et al. (2015) found that conspiracy content with anti-science messages was shared among Italian Facebook users about three times as often as scientific content. Their relation to skepticism about scientific research is well established and is likely bidirectional: implausible findings fuel conspiracy beliefs, and conspiracy beliefs fuel skepticism (Lewandowsky, Oberauer, & Gignac, 2013; see also Lewandowsky, Gignac, & Oberauer, 2013) while exposure to conspiracy theories has been found to reduce inclination to vaccinate one’s children and mitigate climate change (Jolley & Douglas, 2014; van der Linden, 2015). However, conspiracy theories may also provide a powerful impetus to anti-science politics – beyond the tendency for political leaders and spokespeople to merely cast doubt on or ignore scientific findings.

Conclusion

In this chapter, we have reviewed anecdotal and empirical evidence that skepticism and efforts to suppress scientific findings are motivated by concerns about their societal impact. We have attempted to lay the groundwork for further theory and research by suggesting that these phenomena are best understood from a social functionalist perspective. In this perspective, people act, think, and feel not only to satisfy internal motivations such as cognitive consistency but also to achieve social objectives. Our recent work illustrates that these phenomena can be approached with established methods for studying support for censorship and motivated skepticism of science. Much more specific theoretical work is needed to uncover the specific mechanisms that lead scientific findings to be perceived as harmful. This work might draw on advances in moral reasoning and the perception of harm (Graham, Haidt, & Nosek, 2009; Gray,

Schein, & Ward, 2014). A critical question is whether judgments of harmfulness may themselves be rationalizations of opposition to research that are motivated by other moral concerns, such as perceived purity violations (cf. Graham et al., 2009), or more parochial concerns such as the perceived interests of the self or a relevant ingroup. Another critical question is what (exactly) different types of scientific research is perceived to harm – an abstract conception such as society, or specific constituencies within society – and whether this affects the degree and form of opposition to science. Further theoretical work is also required to understand boundary conditions – notably, when people perceive scientific findings to have potentially dangerous impacts but nonetheless do not support efforts to suppress them or to punish researchers. Science is routinely and quite appropriately judged according to the good that it can do us (Massey & Barreras, 2013). Funders consider not only the scientific but also the social and economic value of research. Ethics panels, before they approve research, weigh its scientific benefits against the potential harms to its participants. The phenomena we have examined in this chapter, however, are different. They pose a threat to the integrity of science, and – ironically – to its contribution to society. There is an urgent need for research to examine the apparently all-too-common perception that science is a danger that must be counteracted. As long as science is perceived as a danger, we are prone to letting belief systems and ideologies dictate how science is judged rather than letting science shape how we should perceive reality.

References

Bastardi, A., Uhlmann, E. L., & Ross, L. (2011). Wishful thinking: Belief, desire, and the motivated evaluation of scientific evidence. *Psychological Science, 22*(6), 731–732. doi:10.1177/0956797611406447.

Beinart, P. (2017, March 6). A violent attack on free speech at Middlebury. *The Atlantic*. Retrieved from www.theatlantic.com/politics/archive/2017/03/middlebury-free-speech-violence/518667/.

Bessi, A., Coletto, M., Davidescu, G. A., Scala, A., Caldarelli, G., & Quattrociocchi, W. (2015). Science vs conspiracy: Collective narratives in the age of misinformation. *PloS One, 10*(2), e0118093. doi:10.1371/journal.pone.0118093.

Bilewicz, M. (2016). The dark side of emotion regulation: Historical defensiveness as an obstacle in reconciliation. *Psychological Inquiry, 27*(2), 89–95. doi:10.1080/1047840x.2016.1162130.

Brandt, M. J., Reyna, C., Chambers, J., Crawford, J., & Wetherell, G. (2014). The ideological-conflict hypothesis: Intolerance among both liberals and conservatives. *Current Directions in Psychological Science*, *23*, 27–34.

Brown, R., & Gilman, A. (1960). The pronouns of power and solidarity. In T. A. Sebeok (Ed.), *Style in language* (pp. 253–276). Cambridge: MIT Press.

Campbell, T. H., & Kay, A. C. (2014). Solution aversion: On the relation between ideology and motivated disbelief. *Journal of Personality and Social psychology*, *107*(5), 809–824. doi:10.1037/a0037963.

Chiacu, D., & Volcovici, V. (2017, March 19). EPA chief unconvinced on CO_2 link to global warming. *Reuters*. Retrieved from www.reuters.com/article/us-usa-epa-pruitt/epa-chief-unconvinced-on-co2-link-to-global-warming-idUSKBN16G1XX.

Chung, S., & Moon, S. I. (2016). Is the third-person effect real? A critical examination of rationales, testing methods, and previous findings of the third-person effect on censorship attitudes. *Human Communication Research, 42*(2), 312–337. doi:10.1111/hcre.12078.

Clark, H. H. (1992). *Arenas of language use*. Stanford, CA; Chicago, IL: Center for the Study of Language & Information.

Colombo, M., Bucher, L., & Inbar, Y. (2016). Explanatory judgment, moral offense and value-free science. *Review of Philosophy and Psychology, 7*(4), 743–763. doi:10.1007/s13164-015-0282-z.

Columbia Law School. Sabin Center for Climate Change Law. (2018). Silencing science tracker. Retrieved from http://columbiaclimatelaw.com/resources/silencing-science-tracker/about/.

Davison, W. P. (1983). The third-person effect in communication. *Public Opinion Quarterly, 47*(1), 1–15. doi:10.1086/268763.

Devine-Wright, P., Price, J., & Leviston, Z. (2015). My country or my planet? Exploring the influence of multiple place attachments and ideological beliefs upon climate change attitudes and opinions. *Global Environmental Change, 30,* 68–79. doi:10.1016/j.gloenvcha.2014.10.012.

Ditto, P. H., & Lopez, D. F. (1992). Motivated skepticism: Use of differential decision criteria for preferred and nonpreferred conclusions. *Journal of Personality and Social Psychology, 63*(4), 568. doi:10.1037/0022-3514.63.4.568.

Dominus, S. (2017, October 18). When the revolution came for Amy Cuddy. *The New York Times Magazine*. Retrieved from www.nytimes.com/2017/10/18/magazine/when-the-revolution-came-for-amy-cuddy.html.

Douglas, K. M., & Sutton, R. M. (2004). Right about others, wrong about ourselves? Actual and perceived self-other differences in resistance to persuasion. *British Journal of Social Psychology, 43*(4), 585–603. doi:10.1348/0144666042565416.

Douglas, K. M., & Sutton, R. M. (2008). The hidden impact of conspiracy theories: Perceived and actual influence of theories surrounding the death of Princess Diana. *The Journal of Social Psychology, 148*(2), 210–222. doi:10.3200/socp.148.2.210-222.

Douglas, K. M., Sutton, R. M., & Cichocka, A. (2017). The psychology of conspiracy theories. *Current Directions in Psychological Science, 26*(6), 538–542. doi:10.1177/0963721417718261.

Dreger, A. (2015). *Galileo's middle finger: Heretics, activists and the search for justice in science*. New York, NY: Penguin Group.

Duarte, J. L., Crawford, J. T., Stern, C., Haidt, J., Jussim, L., & Tetlock, P. E. (2015). Political diversity will improve social psychological science. *Behavioral and Brain Sciences, 38*, 1–58. doi:10.1017/s0140525x14000430.

Echterhoff, G., Higgins, E. T., & Levine, J. M. (2009). Shared reality: Experiencing commonality with others' inner states about the world. *Perspectives on Psychological Science, 4*(5), 496–521. doi:10.1111/j.1745-6924.2009.01161.x.

Feygina, I., Jost, J. T., & Goldsmith, R. E. (2010). System justification, the denial of global warming, and the possibility of "system-sanctioned change". *Personality and Social Psychology Bulletin, 36*(3), 326–338. doi:10.1177/0146167209351435.

Flak, A. L., Su, S., Bertrand, J., Denny, C. H., Kesmodel, U. S., & Cogswell, M. E. (2014). The association of mild, moderate, and binge prenatal alcohol exposure and child neuropsychological outcomes: A meta-analysis. *Alcoholism: Clinical and Experimental Research, 38*(1), 214–226. doi:10.1111/acer.12214.

Frayer, L., & Saracoglu, G. (2017, August 20). In Turkey, schools will stop teaching evolution this fall. *National Public Radio*. Retrieved from

www.npr.org/sections/parallels/2017/08/20/540965889/in-turkey-schools-will-stop-teaching-evolution-this-fall.

Gauchat, G. (2012). Politicization of science in the public sphere: A study of public trust in the United States, 1974 to 2010. *American Sociological Review, 77*(2), 167–187. doi:10.1177/0003122412438225.

Gavaghan, C. (2009). "You can't handle the truth": Medical paternalism and prenatal alcohol use. *Journal of Medical Ethics, 35*(5), 300–303. doi:10.1136/jme.2008.028662.

Gillborn, D. (2016). Softly, softly: Genetics, intelligence and the hidden racism of the new geneism. *Journal of Education Policy, 31*(4), 365–388. doi:10.1080/02680939.2016.1139189.

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology, 96*(5), 1029. doi:10.1037/a0015141.

Gray, K., Schein, C., & Ward, A. F. (2014). The myth of harmless wrongs in moral cognition: Automatic dyadic completion from sin to suffering. *Journal of Experimental Psychology: General, 143*(4), 1600–1615.

Haynes, R. (2003). From alchemy to artificial intelligence: Stereotypes of the scientist in Western literature. *Public Understanding of Science, 12*(3), 243–253. doi:10.1177/0963662503123003.

Henderson, J., Gray, R., & Brocklehurst, P. (2007). Systematic review of effects of low–moderate prenatal alcohol exposure on pregnancy outcome. *BJOG: An International Journal of Obstetrics & Gynaecology, 114*(3), 243–252. doi:10.1111/j.1471-0528.2006.01163.x.

Henderson, J., Kesmodel, U., & Gray, R. (2007). Systematic review of the fetal effects of prenatal binge-drinking. *Journal of Epidemiology and Community Health, 61*(12), 1069–1073. doi:10.1136/jech.2006.054213.

Hennes, E. J., Hampton, A. J., Ozgumus, E., & Hamori, T. J. (2018). System-level biases in the production and consumption of information: Implications for system resilience and radical change. In B. T. Rutjens, & M. J. Brandt (Eds.), *Belief systems and the perception of reality*. Oxon: Routledge.

Hersher, R. (2017, November 29). Climate scientists watch their words, hoping to stave off funding cuts. *National Public Radio*. Retrieved from www.npr.org/sections/thetwo-way/2017/11/29/564043596/climate-scientists-watch-their-words-hoping-to-stave-off-funding-cuts.

Hornsey, M. J., & Fielding, K. S. (2017). Attitude roots and Jiu Jitsu persuasion: Understanding and overcoming the motivated rejection of science. *American Psychologist, 72*(5), 459. doi:10.1037/a0040437.

Humphriss, R., Hall, A., May, M., Zuccolo, L., & Macleod, J. (2013). Prenatal alcohol exposure and childhood balance ability: Findings from a UK birth cohort study. *BMJ Open, 3*(6), e002718. doi:10.1136/bmjopen-2013-002718.

Ioannidis, J. P. A. (2012). Why science is not necessarily self-correcting. *Perspectives on Psychological Science, 7(*6), 645–654. doi:10.1177/1745691612464056.

Jensen, T. (2013, April 2). *Democrats and Republicans differ on conspiracy theory beliefs.* Retrieved from www.publicpolicypolling.com/polls/democrats-and-republicans-differ-on-conspiracy-theory-beliefs/.

Jolley, D., & Douglas, K. M. (2014). The social consequences of conspiracism: Exposure to conspiracy theories decreases intentions to engage in politics and to reduce one's carbon footprint. *British Journal of Psychology, 105*(1), 35–56. doi:10.1111/bjop.12018.

Jussim, L., Crawford, J. T., Anglin, S. M., Stevens, S. T., & Duarte, J. L. (2016). Interpretations and methods: Towards a more effectively self-correcting social psychology. *Journal of Experimental Social Psychology*, *66*, 116–133. doi:10.1016/j.jesp.2015.10.003.

Jussim, L., Stevens, S. T., & Honeycutt, N. (2018). *Forbidden and unasked questions about stereotype accuracy.* Manuscript submitted for publication.

Jylhä, K. M., Cantal, C., Akrami, N., & Milfont, T. L. (2016). Denial of anthropogenic climate change: Social dominance orientation helps explain the conservative male effect in Brazil and Sweden. *Personality and Individual Differences*, *98*, 184–187. doi:10.1016/j.paid.2016.04.020.

Kahan, D. M. (2013). Ideology, motivated reasoning, and cognitive reflection: An experimental study. *Judgment and Decision Making*, *8*(4), 407–424. doi:10.2139/ssrn.2182588.

Kashima, Y. (2000a). Recovering Bartlett's social psychology of cultural dynamics. *European Journal of Social Psychology*, *30*(3), 383–403. doi:10.1002/(SICI)1099-0992(200005/06)30:3<383::AID-EJSP996>3.0.CO;2-C.

Kashima, Y. (2000b). Maintaining cultural stereotypes in the serial reproduction of narratives. *Personality and Social Psychology Bulletin*, *26*(5), 594–604. doi:10.1177/0146167200267007.

Kempner, J., Perlis, C. S., & Merz, J. F. (2005). Forbidden knowledge. *Science*, *307*(5711), 854. doi:10.1126/science.1107576.

Klar, Y., & Bilewicz, M. (2017). From socially motivated lay historians to lay censors: Epistemic conformity and defensive group identification. *Memory Studies*, *10*(3), 334–346. doi:10.1177/1750698017701616.

Kruglanski, A. W. (1990). Lay epistemic theory in social-cognitive psychology. *Psychological Inquiry*, *1*(3), 181–197. doi:10.1207/s15327965pli0103_1.

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, *108*(3), 480–498. doi:10.1037/0033-2909.108.3.480.

Landau, M. J., Kay, A. C., & Whitson, J. A. (2015). Compensatory control and the appeal of a structured world. *Psychological Bulletin*, *141*(3), 694.

Lee, E., Sutton, R. M., & Hartley, B. L. (2016). From scientific article to press release to media coverage: Advocating alcohol abstinence and democratising risk in a story about alcohol and pregnancy. *Health, Risk & Society*, *18*(5–6), 247–269. doi:10.1080/13698575.2016.1229758.

Lewandowsky, S., Gignac, G. E., & Oberauer, K. (2013). The role of conspiracist ideation and worldviews in predicting rejection of science. *PLoS One*, *8*(10), e75637. doi:10.1371/journal.pone.0075637.

Lewandowsky, S., Mann, M. E., Bauld, L., Hastings, G., & Loftus, E. F. (2013). The subterranean war on science. *APS Observer*, *26*(9). Retrieved from www.psychologicalscience.org/observer/the-subterranean-war-on-science/comment-page-1.

Lewandowsky, S., Mann, M. E., Brown, N. J., & Friedman, H. (2016). Science and the public: Debate, denial, and skepticism. *Journal of Social and Political Psychology*, *4*(2), 537–553. doi:10.5964/jspp.v4i2.604.

Lewandowsky, S., Oberauer, K., & Gignac, G. E. (2013). NASA faked the moon landing – therefore, (climate) science is a hoax: An anatomy of the motivated rejection of science. *Psychological Science*, *24*(5), 622–633. doi:10.1177/0956797612457686.

Lewis, S. J., Zuccolo, L., Davey Smith, G., Macleod, J., Rodriquez, S., Draper, E. S., & … Gray, R. (2012). Fetal alcohol exposure and IQ at age 8: Evidence from a population-based birth-cohort study. *PLoS One, 7*(11), e49407. doi:10.1371/journal.pone.0049407.

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*(11), 2098–2109. doi:10.1037/0022-3514.37.11.2098.

Lowe, P., Lee, E., & Yardley, L. (2010). Under the influence? The construction of foetal alcohol syndrome in UK newspapers. *Sociological Research Online, 15*(4), 2. doi:10.5153/sro.2225.

Massey, S. G., & Barreras, R. E. (2013). Introducing "impact validity". *Journal of Social Issues*, 69(4), 615–632. doi:10.1111/josi.12032.

McClure, J., Hilton, D. J., & Sutton, R. M. (2007). Judgments of voluntary and physical causes in causal chains: Probabilistic and social functionalist criteria for attributions. *European Journal of Social Psychology*, *37*(5), 879–901. doi:10.1002/ejsp.394.

McConnell, P. & Sutton, R. M. (2018). *The intolerable truth: Perceptions of malfeasance, harmful impact, and the desire to censor ideologically dissonant research findings*. Manuscript in preparation.

McKie, R. (2017, February 20). Scientists attack their 'muzzling' by government. *The Observer*. Retrieved from www.theguardian.com/science/2016/feb/20/scientists-attack-muzzling-government-state-funded-cabinet-office.

Murphy, A. O., Sutton, R. M., Douglas, K. M., & McClellan, L. M. (2011). Ambivalent sexism and the “do”s and “don’t”s of pregnancy: Examining attitudes toward proscriptions and the women who flout them. *Personality and Individual Differences, 51*(7), 812–816. doi:10.1016/j.paid.2011.06.031.

Nosek, B. A., Alter, G., Banks, G. C., Borsboom, D., Bowman, S. D., Breckler, S. J., … & Contestabile, M. (2015). Promoting an open research culture. *Science, 348*(6242), 1422–1425. doi:10.1126/science.aab2374.

Nuccitelli, D. (2017, January 31). Trump is copying the Bush censorship playbook. Scientists aren’t standing for it. *The Guardian*. Retrieved from www.theguardian.com/environment/climate-consensus-97-per-cent/2017/jan/31/trumps-copying-the-bush-censorship-playbook-scientists-arent-standing-for-it.

The Professional Institute of the Public Service of Canada. (2013). Most federal scientists feel they can’t speak out, even if public health and safety at risk, says new survey. Retrieved from www.pipsc.ca/portal/page/portal/website/issues/science/bigchill.

Rutjens, B. T., & Heine, S. J. (2016). The immoral landscape? Scientists are associated with violations of morality. *PLoS One, 11*(4), e0152798. doi:10.1371/journal.pone.0152798.

Rutjens, B. T., Heine, S. J., Sutton, R., & van Harreveld, F. (2018). Attitudes towards science. *Advances in Experimental Social Psychology, 57*. doi:10.1016/bs.aesp.2017.08.001.

Rutjens, B. T., van Harreveld, F., & van der Pligt, J. (2013). Step by step: Finding compensatory order in science. *Current Directions in Psychological Science*, *22*(3), 250–255. doi:10.1177/0963721412469810.

Skitka, L. J., & Washburn, A. (2016). Are conservatives from Mars and liberals from Venus? Maybe not so much. In P. Valdesolo, & J. Graham (Eds.), *Social psychology of political polarization* (pp. 78–101). New York, NY: Routledge.

Stevens, S. T., Jussim, L., Anglin, S. M., & Honeycutt, N. (2018) Direct and indirect influences of political ideology on perceptions of scientific findings. In B. T. Rutjens, & M. J. Brandt (Eds.), *Belief systems and the perception of reality*. Oxon: Routledge.

Sutton, R. M., & Douglas, K. M. (2014). Examining the monological nature of conspiracy theories. In J. W. van Prooijen, & P. A. M. van Lange (Eds.), *Power, politics, and paranoia: Why people are suspicious of their leaders* (pp. 254–272). Cambridge: Cambridge University Press.

Sutton, R. M., Douglas, K. M., & Petterson, A. (2018). A tale of two conspiracies: Similarities and differences between conspiracy theories on either side of the climate debate. Manuscript in preparation.

Sutton, R. M., Lee, E., & Hartley, B. L. (2018). Could studies of drinking during pregnancy encourage drinking during pregnancy? Reactions to scientific research are shaped by concerns about its impact. Manuscript in preparation.

Tetlock, P. E. (2002). Social functionalist frameworks for judgment and choice: Intuitive politicians, theologians, and prosecutors. *Psychological Review, 109*(3), 451–471. doi:10.1037/0033-295x.109.3.451.

Tetlock, P. E., & Manstead, A. S. (1985). Impression management versus intrapsychic explanations in social psychology: A useful dichotomy? *Psychological Review, 92*(1), 59–77. doi:10.1037/0033-295X.92.1.59.

Toma, C., & Butera, F. (2009). Hidden profiles and concealed information: Strategic information sharing and use in group decision making. *Personality and Social Psychology Bulletin, 35*(6), 793–806. doi:10.1177/0146167209333176.

University of Bristol (2012). *Even moderate levels of drinking in pregnancy can affect a child's IQ* [Press release]. Retrieved from www.bristol.ac.uk/news/2012/8936.html.

van der Linden, S. (2015). The conspiracy-effect: Exposure to conspiracy theories (about global warming) decreases pro-social behavior and science acceptance. *Personality and Individual Differences, 87*, 171–173. doi:10.1016/j.paid.2015.07.045.

Washburn, A. N., & Skitka, L. J. (2017). Science denial across the political divide: Liberals and conservatives are similarly motivated to deny attitude-inconsistent science. *Social Psychological and Personality Science.* Advance online publication. doi:10.1177/1948550617731500.

Wilson, E. O. (1995). Science and ideology. *Academic Questions, 8*(3), 73–81. doi:10.1007/bf02683222.

The World Bank. (2018). Graph illustration of research and development expenditure from 1996–2015. Retrieved from https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.