**Misinformation, Disinformation, and Violent Conflict:**
**From Iraq and the "War on Terror" to Future Threats to Peace**

Misinformation, Disinformation, and Violent Conflict:

From Iraq and the "War on Terror" to Future Threats to Peace

Stephan Lewandowsky

University of Western Australia and University of Bristol

Werner G. K. Stritzke

University of Western Australia

Alexandra M. Freund

University of Zurich

Klaus Oberauer

University of Zurich and University of Western Australia

and

Joachim I. Krueger

Brown University


Running head:          Misinformation and Violent Conflict

Address correspondence to:   Stephan Lewandowsky

                         Department of Experimental Psychology

                         University of Bristol

                         Bristol, BS8 1TU, United Kingdom

                         stephan.lewandowsky@bristol.ac.uk

Abstract

The dissemination and control of information are indispensable ingredients of violent conflict, with all parties involved in a conflict or at war seeking to frame the discussion on their own terms. Those attempts at information control often involve the dissemination of misinformation or disinformation (i.e., information that is incorrect by accident or intent, respectively). We review the way in which misinformation can facilitate violent conflicts, and conversely, how the successful refutation of misinformation can contribute to peace. We illustrate the relevant cognitive principles by examining two case studies. The first, retrospective case involves the Iraq War of 2003 and the "War on Terror." The second, prospective case points to likely future sources of conflict arising from climate change and its likely consequences.

Misinformation, Disinformation, and Violent Conflict:

From Iraq and the "War on Terror" to Future Threats to Peace

This special issue of the *American Psychologist*, which was conceived and organized by the authors of this article, provides cutting-edge psychological theory and research on intergroup conflict, war, and peace-making. The work presented in this special issue asserts the vital role the science of psychology can play, in conjunction with the other social sciences, to prevent violent conflict where possible, or to assist with reconciliation after a conflict has concluded. Christie and Montiel (this issue) examine the complementary tension within our discipline between the tradition of psychology's significant contribution to war efforts, and those who focused their scholarship on the prevention of war and promotion of peace. The remaining articles survey a broad range of psychological variables relevant to peace, including conflict prevention and resolution (Al Ramiah & Hewstone, this issue), healing and reconciliation (Staub, this issue), effects of mortality salience on escalation and de-escalation of violent intergroup conflicts (Jonas & Fritsche, this issue), promotion of nonviolence and peace (Leidner, Tropp, & Lickel; this issue), the role of self-significance in the deradicalization of terrorist groups (Kruglanski et al., this issue), and a vision for resilience at the level of the "global community" (Cohrs, Christie, White, & Das, this issue).

This article focuses on one specific issue whose better understanding may make the difference between war and peace: the control and dissemination of information and the public's response to a constantly evolving information landscape. Ever since the Greek writer and poet Aeschylus (525-456 BCE) proclaimed that "truth is the first

casualty of war", warfare has involved not just physical confrontation but also competition for the control of information.

Recent technological developments have created new opportunities for information management that differ qualitatively from the conventional means available before the 21st century. The revelations about the worldwide information gathering activities of the U.S. National Security Agency (NSA), which broke at the time of this writing, vividly illustrate the power and full-spectrum, global reach of modern information gathering.

Accordingly, military experts are increasingly concerned with the control of information during warfare. It has been suggested that the center of gravity during future warfare will shift "…from the will of governments and armies to the perceptions of populations. Victory will be defined more in terms of capturing the psycho-cultural rather than the geographical highground" (Scales, 2006, p. 18). This is not an isolated claim, and projections for the growing importance of information control are widespread (Boyd, 2007; Claessen, 2007; Darley, 2007; Murphy, 2010; for a review, see King, 2011). For example, a stated goal of the U.S. military is to achieve "full-spectrum dominance" in all spheres of operation, including the global information environment (Department of Defense, 2000). Those goals thus include influencing what people think, perceive, visualize, feel, and decide (King, 2011).

Warfare and violent conflict have assumed an increasingly psychological dimension that relates to the way in which people cognitively and emotionally process information. In particular, given that at least some competing parties in a conflict are likely to engage in propaganda that is not bound by the rules of truthful discourse, warfare is also an issue of how people respond to *misinformation*—information presented as truthful initially but that turns out to be false later on—and

*disinformation*—outright false information that is disseminated for propagandistic purposes but may be identifiable as false later on.

In the remainder of this article, we focus on the cognitive processes that underlie the acceptance of information as true, and on how people respond when that information later on turns out to be false. We emphasize people's continued reliance on misinformation and the variables that facilitate debiasing and updating of beliefs. We show how people's continued reliance on false information, whatever its source, can undermine peace and increase the readiness for war. We also show the converse; namely, how findings from research on debiasing strategies can help mitigate the threat of future conflicts by facilitating the discounting of misinformation.

Our analysis is illustrated by two "case studies": first, a retrospective analysis of the cognitive issues surrounding the invasion of Iraq in 2003 and the "Global War on Terror" during the George W. Bush administration; second, a prospective analysis of how current public discourse may affect future threats to peace that are likely to arise from unmitigated climate change. We chose those particular cases because both have been the subject of intense public debate and scholarly examination. The fact that both issues are highly emotive and polarizing renders them particularly suitable as case studies of how evidence-based analysis of people's information processing can assist in the creation of debiasing messages in emotionally and ideologically charged situations. Both case studies use a three-pronged approach: We first briefly sketch the mechanisms by which (mis-) information is transmitted; we then examine the cognitive processes at the individual level with which that information is processed; and we conclude by reviewing the variables that can help debias individuals, thereby reducing the continued influence of misinformation.

Misinformation in the Iraq War and the Global War on Terror

The period right after the September 11, 2001, terror attacks is particularly illustrative of the interplay between (mis-) information and warfare. Some 18 months after the attacks, the U.S. and its allies launched a war on Iraq. The premise underlying the official *casus belli* was to remove Weapons of Mass Destruction (WMD) from Iraq. This premise later turned out to be false, as no WMD were ever found.

*The importance of narrative: Framing of a conflict*

Parties involved in a conflict nearly always create a conflict-supporting narrative that provides an explanation and justification for their involvement (e.g., Bar-Tal, 1998). A societal narrative can provide explanation and justification of the suffering and hardship that inevitably arises from violent conflict, for example by buttressing beliefs about the justness of one's own cause and by delegitimizing the opponent (Bar-Tal, 1998; see also Auerbach, 2009; Hammack, 2008). In the present context, an analysis of narratives is important because it facilitates understanding of the information landscape that contributed to the Iraq War. Narratives or "frames" with which the world is viewed and communicated are not the same as "spin" or "propaganda," or any other negatively-valenced aspect of information management. Instead, frames and narratives are necessary cognitive tools, designed to pare down information in order to manage complexity. These tools facilitate communication even if they emphasize facts unevenly (Nisbet, 2009).

Narratives are crucial to understanding conflicts and their underlying information architecture. Within the United States, the prevailing narratives leading up to the Iraq War of 2003 facilitated the dissemination of misinformation, which, in some instances, has been resilient to correction for up to a decade. The prevailing narrative

considered preemptive war to be a form of self-defense and it applied a "war"

metaphor to terrorism.

*Preemptive war as self-defense.* The Bush administration sought public support

for their preemptive war on Iraq by pursuing four lines of argument: (1) That Saddam

Hussein was an undeterrable aggressor who (2) co-operated with al-Qaida (and was

involved in the attacks of September 11, 2001), and who (3) sought to acquire nuclear

weapons, and (4) possessed WMDs that could be used against Americans (Kaufman,

2004). The latter three arguments are now widely recognized to be factually incorrect,

and the nonexistence of WMDs in Iraq and the absence of any links between Iraq and

al-Qaida eventually became the official bipartisan U.S. position with the Duelfer

report (Central Intelligence Agency, 2005) and the report of the U.S. Senate Select

Committee on Intelligence (2006), respectively.

In the lead-up to the war, the administration's narrative was accepted and largely

endorsed by the American media. Several investigations have pointed to the lack of

skepticism in U.S. media reports (e.g., Artz & Kamalipour, 2005; Kamalipour &

Snow, 2004; Rampton & Stauber, 2003; Schecter, 2003; Tiffen, 2009). For example, a

study of network television news stories on Iraq over the two-week period after U.S.

Secretary of State Colin Powell's speech to the United Nations (5 February 2003)

found that more than two thirds of the 393 sources used were from the U.S., with

most of these (75%) being either current or retired officials. Only a single one of these

nearly 200 officials—Senator Edward Kennedy—expressed skepticism or opposition

to the impending invasion (FAIR, 2003). The implications of such homogeneity in the

media landscape have been highlighted by several other contributions to this special

issue, for example Leidner et al. (this issue), who note the importance of promoting

critical evaluation of ingroups. (See also the articles by Christie & Montiel, and Jonas & Fritsche, this issue.)

Because pre-invasion media coverage presented little critical evalution of the "ingroup" narrative, the alternative narrative, namely that the preemptive invasion of Iraq was not primarily defensive, remained largely inaccessible to the U.S. public. This alternative narrative did however gather considerable prominence abroad. A 2007 poll found that 75% of the public across 26 countries disapproved of the way the U.S. handled the war in Iraq (Kull, 2007). A large share of the world's population appeared to question the view that the military of democratic nations—at least in the context of the U.S.-led invasion of Iraq—is a force for good, as purported by some scholars (e.g., Taylor, 2003). Many people around the world instead appear to consider armed forces—including those from democratic nations—at least potentially instruments of oppression (see Cohrs et al., this issue). The fact that alternative narratives based on this common perception abroad received little prominence in the U.S. before the invasion of Iraq may have contributed to the "failure of the marketplace of ideas" (Kaufmann, 2004, p. 5) that permitted a war to be launched on premises that later turned out to be false.

What psychological mechanisms contributed to this failure? At an anecdotal level, CBS anchorman Dan Rather noted that: "… there was a time in South Africa that people would put flaming tyres around people's necks if they dissented. And in some ways the fear is that you will be necklaced here, you will have a flaming tyre of lack of patriotism put around your neck" (*The Guardian*, 17 May 2002). At an empirical level, this pressure to conform is discussed in several articles in this issue; for example Leidner et al. (this issue) note how moral disengagement can silence any calls to avoid or stop violence. One way in which such moral disengagement can

occur is through the deployment of diabolical enemy images of the "other" (Frank, 1967; White, 1966; for more details see Christie & Montiel, this issue; and Leidner et al., this issue). An analysis of nearly 2,500 editorial cartoons published during the lead-up to the invasion of Iraq revealed a pervasive tendency to dehumanize the "enemy," and the person of Saddam Hussein in particular (Hart & Hassencahl, 2005). More than 95% of all cartoons that contained Saddam Hussein or the Iraqi military were found to dehumanize the subject in some way; for example by depicting Saddam as an animal, with rats, reptiles, or cockroaches being among the favoured species. Al Ramiah and Hewstone (this issue) show how such repellent portrayals can engender hate, which in turn leads to avoidance of contact with outgroups. The end result is the destabilization of peaceful coexistence and an increase in the potential for violence.

*Terrorism as war.* Almost immediately after the attacks of September 11, 2001, President Bush framed the American response within a war metaphor, and the "Global War on Terror" was launched. From the outset, the war was framed by the administration as a conflict between civilization and barbarism (for a detailed analysis, see Esch, 2010). The administration's public discourse was replete with analogies to World War II, with Islamic terrorism being likened to the evil of fascism. This narrative permeated most of the media coverage in the immediate aftermath of September 11 (Abrahamian, 2003), with some scholars seeing the American media as "reifying" the War on Terror label to become the uncontested and "taken-for-granted common-sense notion" (Reese & Lewis, 2009, p. 777). By framing the conflict in simplistic ingroup-outgroup terms, media coverage was feeding a "… culture of fear of Islam, while heightening the United States as a good Christian nation" (Powell, 2011, p. 105).

Framing the response to terrorism as a war creates a narrative with several implications that are suited to extend and prolong the conflict: It suggests an existential threat to society that justifies mobilizing all resources regardless of the cost. It implies that the goal is not the prevention of further attacks but victory over an enemy. This perspective seems to justify offensive measures, including the invasion of foreign countries. Perhaps inadvertently, it also promotes the perpetrators of terrorist acts to soldiers of an enemy army, thereby attributing them the power and importance that they crave (Frey, 2004). The war framing thus fits well with the terrorists' propaganda, helping them to recruit new "soldiers" for the "war against America."

An alternative framing of terrorism relies on a "crime" metaphor, whereby terrorists are cast as criminals who break laws for identifiable and explicable reasons. On this narrative, the appropriate response to terrorism is not war but the pursuit of justice. Research in psychology and allied disciplines has generally identified the latter, crime-focused, approach as promising a greater likelihood of success (e.g., McCauley, 2009; see also Clarke & Newman, 2009). Several articles in this issue highlight the psychological variables that may cause some individuals to become terrorists, from well-known social-learning processes to the mechanisms by which it may become seemingly moral to engage in violence (Leidner et al., this issue). Kruglanski et al. (this issue) argue that the presumption that terrorists are "crazy" is misplaced and that terrorism is best understood within a psychological context that recognizes people's need to feel that their lives are significant. This alternative narrative of terrorism found little prominence in U.S. media coverage after 9/11, with the exception of acts of terrorism that were perpetrated by non-Muslim U.S. citizens: In those cases, the media covered the perpetrators "… as human beings who are

mentally unstable, who have concerned family members that didn't understand the act of terrorism or condone it" (Powell, 2011, p. 106).

*Societal narratives and individual cognition*

Why are narratives so successful? Why do people judge the risk from terrorism to be greater if Islamic groups are suspected of involvement than if homegrown militants are thought to be responsible (Woods, 2011)? Why did approximately 20% of the American public believe that WMDs were not only present in Iraq in 2003, but were *used* by Iraqis during the invasion (Kull, Ramsay, & Lewis, 2004)?

One factor involves the tacit norms of everyday conversation, which predispose people to believe what they hear or read because speakers are assumed to be truthful (e.g., Grice, 1975; Schwarz, 1994). This tendency is amplified when new information is compatible with other things the recipient assumes to be true (for reviews, see e.g., McGuire, 1972). If public discourse is dominated by one narrative, then for most people any additional narrative-consonant information is likely to be believed simply because it is compatible with other information in memory. Moreover, information that is repeatedly presented becomes particularly difficult to dislodge by correction if it later on turns out to be false (Ecker, Lewandowsky, Swire, & Chang, 2011).

An additional possible consequence of the repetition of frame-consonant information, at the expense of potentially dissenting voices, is "pluralistic ignorance" (Katz & Allport, 1931; Krueger, 2002). Pluralistic ignorance refers to the divergence between the prevalence of *actual* beliefs and what people think others believe. For example, the preponderance of voices that advocated unilateral military action in the lead-up to the Iraq War caused the large majority of the American public that *actually* wanted the U.S. to engage multilaterally—i.e., in concert with other nations—to feel that they were in the minority (Todorov & Mandisodza, 2004). Conversely, the *actual*

minority of people who advocated unilateral action incorrectly felt that they represented the majority of the public's views.

*From narrative to persistent reliance on misinformation*

Once societal narratives and frames have facilitated the uptake of information, even incorrect beliefs can become sufficiently entrenched to resist subsequent correction. The reasons for the longevity and persistence of mistaken beliefs are fairly well understood and need not be surveyed again here (for a detailed review, see Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012). Given the context of our case study, we focus on the role of people's personal "worldviews" or "cultural cognitions"; that is, people's core beliefs about values relating to equality and authority, individualism and community (e.g., Kahan, 2010).

Ironically, factual but worldview-opposing information can sometimes reinforce beliefs based on initial misinformation (e.g., Nyhan & Reifler, 2010). In one of Nyhan and Reifler's experiments, Conservatives who received a correction informing them that Iraq did not have WMD's in 2003 became *more* likely to believe in the existence of Iraqi WMD than those in a no-correction control condition. This "worldview backfire effect" has been attributed to people covertly "counter-arguing" against any information that challenges their worldview. Using a "challenge interview" technique, Prasad et al. (2009) illuminated this counter-arguing process by asking subjects to respond aloud to information that was debunking previously-held beliefs. Participants either generated counterarguments or simply remained unmovable (e.g., "I guess we still can have our opinions and feel that way").

Those laboratory findings help explain the extraordinary persistence of mistaken beliefs relating to WMD: The persistence of the belief that Iraq possessed WMD for a few months after the invasion (Kull et al., 2004) might have reflected a mere inertia of

public opinion, and one might have expected that those erroneous beliefs would fade away over time. Subsequent opinion polls, however, have shown otherwise. A sizable segment of the American public (i.e., between 35% and 40%) continued to believe that Iraq had WMD until 2008—i.e., more than 5 years after the post-invasion search for WMD came up empty (Jacobson, 2010; Kull, Ramsay, Stephens, Weber, Lewis, & Hadfield, 2006; Nyhan & Reifler, 2012). The prevalence of that mistaken belief has differed sharply along partisan lines, with Republicans being more likely (average 61% across a number of polls 2006-2008) than Democrats (average 18%) to believe that Iraq possessed WMD immediately prior to the invasion.

There is a reasonably clear link between the prevalence of misinformation and support for the Iraq War, both before and after military action commenced. Using representative survey data, Kull et al. (2004) showed that support for the war was a direct function of the extent to which people held misperceptions involving WMD and various other war-related facts. Belief in misinformation was the most powerful predictor of support for the war (it quadrupled the likelihood of support), ahead of intention to vote for President Bush (tripling the likelihood of support). All other variables were far less influential (see, e.g., Kaufmann, 2004, for further evidence of the link between acceptance of misinformation and support for the war). Although the causality of this association cannot be readily ascertained, the mere possibility that the prevalence of misinformation contributes to the risk of war mandates an examination of how widespread myths can be corrected.

*Combating misinformation: Debiasing techniques*

The partisan polarization of information relating to the Iraq War is notable (Jacobson, 2010). We have already seen that an attempt to correct misinformation can backfire if the correction is worldview-dissonant, and that it can further entrench false

beliefs rather than dislodge them (Nyhan & Reifler, 2010; Prasad et al., 2009). In light of the risk of worldview backfire effects, how can people be encouraged to update their memories and beliefs even if those beliefs touch on core components of their worldview? We focus on three psychological processes at different levels of analysis: (1) The role of an individual's skepticism in the discounting of misinformation, (2) the potential role of the media in debiasing, and (3) ways in which the role of worldview as an obstacle to debiasing can be mitigated.

*The role of skepticism or suspicion.* It is known that skepticism or suspicion of the origin of information can facilitate its later dismissal if that information turns out to be false. In a mock courtroom study, Fein, McCloskey, and Tomlinson (1997) showed that "jurors" who were instructed to disregard a piece of inadmissible evidence were still influenced by the tainted evidence despite their overt claims to the contrary. Jurors were only able to disregard the tainted evidence when they were made suspicious of the motives of the media or the prosecutor who disseminated the tainted information in the first place. (For example, suspicion might be induced by suggesting that the prosecutor planted information in the media in order to sway public opinion.) In addition, there is evidence that pre-existing skepticism, perhaps arising from people's political views, plays a crucial role in permitting the discounting of misinformation.

Lewandowsky, Stritzke, Oberauer, and Morales (2005, 2009) showed that people who did not accept the principal official *casus belli* for the invasion of Iraq (viz., the destruction of WMD) were more accurate in processing war-related information than people who accepted that the invasion was launched to remove WMD. In particular, people skeptical of the official *casus belli* were less likely to believe information they knew to have been retracted than were those who endorsed WMD as the reason for

the conflict—the latter group of people acknowledged that information had been found to be false when responding to a factual question but moments later expressed their continued belief in the truth of the same information.

At the same time, skeptics were also more likely to endorse true information than people who accepted the WMD-related *casus belli* (Lewandowsky et al., 2009); skepticism thus did not translate into "cynicism" or blanket denial of *all* war-related information. These findings underscore the need for critical examinations of official narratives by the media in order to broaden the opinion landscape within which people's skepticism can unfold.

*The role of the media in debiasing.* Large-scale correction of specific misinformation cannot succeed without the support of the media or widespread dissemination of the corrective information. Is there any evidence that such large-scale correction can be achieved? One well-studied precedent involves Listerine mouthwash, whose manufacturers had claimed for decades that Listerine helped prevent or reduce the severity of colds and sore throats. In the 1970's this claim was determined to be false, and Listerine was forced to run a corrective ad campaign to retract those cold-related claims. Although this campaign was only partially effective (Wilkie, McNeill, & Mazis, 1984), consumers' belief that Listerine could alleviate colds was at least found to decline significantly during the ad campaign (Armstrong, Gural, & Russ, 1983). Information concerning a mouthwash is a far cry from correcting opinions that go to the heart of a person's worldview. It is therefore particularly noteworthy that media efforts can be successful even in contexts involving emotive material and a highly traumatized audience.

Staub (this issue) describes field experiments in Rwanda that used the media to reach a population victimized by genocidal intergroup violence. Rwanda was torn

apart along ethnic lines by a bloody civil war in 1994 that killed more than 10% of the population (Paluck, 2009). A decade after the genocide, a Dutch nongovernmental organization produced a radio soap opera that combined education with entertainment and was designed to promote reconciliation in Rwanda. Information about the origins and prevention of inter-group violence, as well as about reconciliation, was embedded in the story line. The show provided the opportunity for a year-long randomized field experiment in which 12 communities around Rwanda were assigned to a treatment group (who listened to the soap opera) and a control group (who listened to a show dedicated to general health issues). Those who listened to the soap opera showed greater empathy with other groups, greater awareness of the traumatic impact of violence, and greater engagement with members of the other group during reconciliation activities (for further details, see Staub, this issue). The fact that even a serious trauma need not be a barrier to information processing is encouraging, especially when combined with knowledge of ways in which the worldview backfire effect can be circumvented.

*Overcoming the worldview backfire effect.* At least three variables have been explored that may reduce or eliminate the worldview backfire effect: They involve reframing, choice of messenger, and self-affirmation, respectively. Concerning reframing, even subtle changes in wording can reduce the worldview-threatening impact of messages, for example when a charge is presented as a "carbon offset" rather than as a "tax" (Hardisty, Johnson, & Weber, 2010). Hardisty et al. found that Republicans sought to avoid a surcharge when it was presented as a tax but were as likely as people with alternative worldviews to pay an identical amount when it was presented as an "offset." For Democrats, wording made no difference to the level of acceptance. Similarly, but in a reverse ideological direction, people who might oppose

nanotechnology based on their over-arching concern for the environment may become more willing to endorse the technology if it is presented as part of a program of environmental protection (Kahan, 2010).

The choice of messenger is another important aspect underlying the acceptance of worldview-dissonant messages. For example, Kahan, Braman, Cohen, Gastil, and Slovic (2010) examined the role of worldview in communications relating to mandatory human-papillomavirus (HPV) vaccinations of adolescent women. HPV is a sexually-transmitted virus that causes cervical cancer. In the study by Kahan et al. (2010), people who opposed vaccinations on the basis of their worldview (because vaccinations are seen to represent government interference or because vaccinations might encourage promiscuity) became less entrenched in their opposition if the expert recommending vaccinations appeared to share their worldview. By contrast, if the same message was presented by an individual with a seemingly opposing worldview (e.g., as suggested by simple features such as haircut or dress), opposition to vaccinations became even more entrenched. The results of Kahan et al. (2010) underscore the need for "messengers" from both sides of the political divide to provide debiasing information. In the context of the Iraq War, such broad-based messenging appears to have been lacking. There is some evidence that viewers of Fox News, an outlet that is widely seen as catering to a conservative audience, were *more* misinformed the *more* attention they paid to the news. In contrast, consumers of print media were better informed if they paid more attention (Kull et al., 2004). The direction of causality is unclear, but some concern might be in order if increased engagement with an information source is associated with more impaired perception of reality.

A final variable that is known to facilitate processing of worldview-dissonant information is self-affirmation. Self-affirmation refers to the process whereby people are given an opportunity to affirm their basic moral values, for example by reporting an occasion when they felt particularly good about themselves because they acted on one of their core values. Following self-affirmation, people are more receptive to worldview-dissonant information than in the absence of self affirmation (Cohen, et al., 2007, Nyhan & Reifler, 2011).

We have reviewed the conditions that gave rise to widespread misperceptions among the public in the lead-up to the Iraq War and during its aftermath. We have also reviewed the cognitive processes that are involved both in the continued reliance on misinformation and in its successful discounting. We now turn to our next case study and consider the implications of our analysis thus far for likely future sources of conflict.

(Mis-)information, Future Conflict, and the Prospects for Peace

Any attempt to prevent warfare must begin with an examination of likely future sources of conflict. Here we focus on risks that arise from the biophysical future of the Earth, in particular with respect to climate change. We focus on climate change for two reasons: First, unlike conventional political sources of conflict, the fundamental physical consequences of climate change are quantifiable. In particular, the upper and lower bounds for future global temperatures can be specified with some confidence (e.g., Intergovernmental Panel on Climate Change, 2007). In light of considerable evidence for a link between those physical attributes and the likelihood of warfare, it follows that the risk of climate-induced future conflicts cannot be ignored.

Second, there is evidence that the public sphere is awash with misinformation relating to climate change (e.g., Boykoff, 2013; Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011), which is at least partly responsible for the delay of mitigative action to date. We therefore suggest that the climate-change context provides a particularly fertile test bed for exploration of the linkage between the management of misinformation and the prospects for peace.

*Climate change and future violent conflict*

We begin by examining the links, if any, between climatic conditions and violent conflict. Adverse consequences of climate change are being experienced already, with the number of weather-related disasters worldwide having increased markedly during the last few decades (e.g., Barthel & Neumayer, 2012; Neumayer & Barthel, 2011). Although to date only a few specific events have been—at least probabilistically— linked to climate change (e.g., the Welsh floods in 2000, Pall, et al., 2011; the European heatwave of 2003, Schär et al., 2004; the Russian heatwave of 2010, Rahmstorf & Coumou, 2011), the overall observed trend in extreme events is consistent with long-standing climatological predictions and suggests that climate change is turning from a vague concern for the future into a contemporary hazard. This possibility is recognized and underscored by some global reinsurance companies (e.g., Munich Re, 2011), although there is disagreement on whether or not the trends in disaster losses can already be unambiguously attributed to climate change (e.g., Bouwer, 2011, vs. Nicholls, 2011).

The impact of some of the extreme events observed to date is notable. For example, the floods in Pakistan in 2010 affected up to 20 million people (Warraich, Zaidi, & Patel, 2011). There is considerable scholarly agreement that climate change will eventually cause large-scale migration. An upper bound on the scale of migration

was suggested by Sherwood and Huber (2010), who argued that entirely unmitigated

climate change (with mean temperature increases of 7-11°C compared to pre-

industrial times) may render large regions of the globe uninhabitable because basic

human physiology prevents life when wet bulb temperature exceeds 35°C. (Wet bulb

temperature is a composite measure of temperature and humidity, and is the

temperature felt when wet skin is exposed to moving air.) Although this is a worst-

case prospect based on pessimistic assumptions about mitigation efforts and the

climate system's behavior, the possibility that much of Australia and substantial parts

of the other continents could become uninhabitable a few centuries hence cannot be

ruled out. If this scenario came to pass, a conflict-free resolution of the inevitable

mass migrations appears highly unlikely. Even projections that are based on a less

extreme, and more likely, temperature increase of 4°C raise the possibility that 187

million people may be displaced during the remainder of this century, largely owing

to sea level rise (Nicholls et al., 2011).

In light of those prospects it is not surprising that climate change has been cited

as a growing security risk for a number of reasons, ranging from mass migration to

drought-induced famine, water scarcity, and conflicts over access to natural resources

(e.g., Gleick, 1989, 1993; Scheffran & Battaglini, 2011). Those concerns for the

future are buttressed by historical analyses which have identified previous changes to

the climate as being related to violent conflict (e.g., Tol & Wagner, 2010; Zhang,

Brecke, Lee, He, & Zhang, 2007; Zhang et al., 2011). Whereas past climatic episodes

tended to be associated with additional warfare when temperatures were *cooler* than

normal, because agricultural production in Europe and other temperate zones was

impaired during cool episodes (Zhang et al., 2007, 2011), excessively warm

temperatures have also been linked to an increased risk of warfare. For example,

Hsiang, Meng, and Cane (2011) found that throughout the tropics, the probability of

new civil conflicts doubles during El Niño years—when temperatures tend to be

warmer than average—relative to La Niña years. Hsiang et al. (2011) suggest that

more than 20% of all civil conflicts since 1950 may have been in part triggered by

environmental changes linked to El Niño events.[2] Most recently, in a meta-analysis of

60 primary studies spanning all regions of the world across a range of time scales,

Hsiang, Burke, and Miguel (2013) found that for each increase of temperature or

rainfall by one standard deviation, the historical record suggests that the probability of

intergroup conflict increases by 14%. The implications of these results become

obvious when it is considered that temperatures may increase by several (i.e., 2-4)

standard deviations by 2050 if human-caused global warming continues unabated.

On balance, the historical record provides sufficiently compelling evidence to

suggest that climatic change will enhance the risk of violent conflict, all other factors

being equal (but see Gartzke, 2012). It follows that mitigation of climate change,

primarily by cutting of greenhouse gas emissions, is a step towards reduction of the

risk of conflict. It is in recognition of this linkage that the Intergovernmental Panel on

Climate Change (IPCC) was awarded the Nobel Peace Prize in 2007. As we show

next, the link between climate mitigation and future conflict puts management of

misinformation centerstage in efforts to foster a more peaceful future.

*Scientific consensus vs. public perception*

There exists a broad consensus in the relevant scientific community that the globe

is warming and that human greenhouse gas emissions are largely responsible. More

than 90% of domain experts are known to agree on those fundamentals (e.g.,

Anderegg, Prall, Harold, & Schneider, 2010; Doran & Zimmerman, 2009), and meta-

analyses of the peer-reviewed literature have likewise uncovered near unanimity (e.g., out of 4,041 relevant papers published since 1990 that expressed a position on the fundamentals of the science, fewer than 3% dissented from the consensual view; Cook, et al., 2013; see also Oreskes, 2004).

The consistency and strength of scientific opinion differs markedly from the comparatively low public concern about climate change in at least some countries (e.g., Brulle, Carmichael, & Jenkins, 2012; Scruggs & Benegal, 2012). Many reasons have been identified for this divergence of public perception from scientific evidence, among them ambiguity aversion (Fox & Tversky, 1995) and the known tendency for wishful thinking in the face of uncertainty about the exact outcomes (Markowitz & Sharif, 2012). Here we focus on the targeted "manufacture of doubt" by vested interests and political groups (e.g., Greenberg, Knight, & Westersund, 2011; Jacques, Dunlap, & Freeman, 2008; McCright & Dunlap, 2003, 2010; Mooney, 2007; Oreskes & Conway, 2010; Stocking & Holstein, 2009). Sociological and historical scholarship has shed considerable light on the efforts to discredit climate science (and scientists) for commercial or ideological reasons (e.g., Dunlap, 2013; Dunlap & McCright, 2011; Lahsen, 1999; Lewandowsky, Cook, Oberauer, & Marriott, 2013). For example, Jacques et al. (2008) found that out of 141 "environmentally sceptical" books published between 1972 and 2005, 92% had identifiable links to conservative think tanks. More recently, similar books have also appeared via a "vanity press"; that is, individuals publishing on their own or paying for publication. Very few of these books are peer reviewed, and most of the authors have no relevant scientific background (Dunlap & Jacques, 2013). This vanity literature is united in its effort to sustain long-debunked arguments against climate science. The U.S. media, especially conservative outlets, tend to treat this literature as if it were equivalent to rigorous

scientific reporting (Elsasser & Dunlap, 2012). As a consequence, issues of climate change are being framed as if they were controversies with two points of view roughly in balance (Dispensa & Brulle, 2003; see also Brulle et al., 2012).

There appear to be sufficient grounds for the conclusion that the systematic dissemination of misinformation (or indeed, disinformation) on climate change is a barrier to political action and mitigation. The resultant delay of countermeasures has likely already increased the future cost of mitigation (Pacala & Socolow, 2004; Socolow, 2011). Moreover, given the link between climate change and warfare that we established earlier, the delay of mitigation may also contribute to making future violent conflict more likely. It follows that the psychology of misinformation about climate change, and a psychological examination of how people process climate-related information, are issues of (future) war and peace.

*Factors determining acceptance of the science of climate change*

Notwithstanding the evidence for the widespread dissemination of disinformation relating to climate change (Dunlap, 2013; Dunlap & McCright, 2011; Dunlap & Jacques, 2013; Jacques et al., 2008; Lahsen, 1999), there is also plenty of *valid* information about climate change available in the public sphere. The public is therefore not at the mercy of disinformation but it can choose which source (and type) of information to consider. Unlike our first case study involving the Iraq War, where the dominant pre-invasion narrative was based on premises now known to be false, in the case of climate change multiple public narratives co-exist at the time of this writing. The narratives range from underscoring the pervasive scientific consensus at one end (e.g., Cook et al., 2013), to the notion that climate science is the "greatest hoax" and a "conspiracy", as purported by the title of a recent book by a U.S. Senator (Inhofe, 2012). Accordingly, there has been much research on the variables that

determine people's acceptance of the findings from climate science. An understanding of these variables is essential to the successful communication of the challenges of global warming, thereby in turn facilitating mitigation measures that may reduce the likelihood of future conflict.

The lion's share of variance in people's opinions relating to climate change is explained by their worldview: People who embrace a laissez-faire vision of free-market economics are likely to reject the findings from climate science (e.g., Heath & Gifford, 2006; Kahan, 2010; Kahan, Jenkins-Smith, & Braman, 2011). The role of worldview is considerable, with nearly 75% of the variance in acceptance of climate science being accounted for in some samples (Lewandowsky, Oberauer, & Gignac, 2013, Table 2). The reasons for the antagonistic relationship between free-market worldviews and climate science arise from the likelihood that climate mitigation measures may require interference with the free market—be it via taxes on carbon or increased regulations. The threat of government interference with the free market has been shown to trigger opposition to otherwise well-established scientific findings (Oreskes & Conway, 2010).

Recent research has also implicated conspiratorial images and thinking among some of the people who reject the findings from climate science. Smith and Leiserowitz (2012) found that among people who reject climate science, up to 40% of affective imagery invoked conspiratorial themes. When asked to provide the first word, thought, or image that came to mind in the climate context, statements such as "the biggest scam in the world to date" were prominent. Similarly, around 20% of respondents in another U.S. survey endorsed the proposition that climate change is a hoax perpetrated by corrupt scientists who wish to spend more taxpayer money on climate research (Lewandowsky, Gignac, & Oberauer, 2013; see also Lewandowsky,

Oberauer, & Gignac, 2013). The involvement of conspiratorial emotions and thoughts has implications for the design of debiasing and debunking messages that we take up later (Sunstein & Vermeule, 2009).

*Communication of climate change*

The involvement of worldview in shaping people's attitudes towards climate science suggests that corrective efforts could backfire, similar to the way in which information about the absence of WMD in Iraq led some participants to believe in their existence even more strongly (Nyhan & Reifler, 2010). Hart and Nisbet (2011) obtained a worldview backfire effect in a study in which participants were presented with information about the potential adverse health consequences of climate change for farming communities. Providing this information polarized people's opinions along partisan lines: For Democrats, information about adverse health consequences increased their support for climate-change mitigation policies, whereas for Republican participants, the same information led to a decline in support. Because Republican participants ended up being less likely to support mitigation policies after receiving the information about adverse health effects than their counterparts in a control group who received no information, these results present a clear illustration of the worldview backfire effect.

Polarization along partisan lines has also been observed outside the laboratory. For example, Hamilton (2011) found in a telephone survey that higher educational attainment was associated with greater concern about global warming among Democrats, whereas the reverse was true for Republicans. Likewise, Hamilton (2011) found that self-reported knowledge of the climate system had opposing effects across partisan lines: For Democrats, increasing knowledge was associated with increasing

concern about the consequences of climate change, whereas the reverse was true for Republicans.

The results of Hamilton (2011) and Hart and Nisbet (2011) point to the now widely-accepted realization that the mere provision of further scientific information is insufficient—or may indeed be counterproductive—to enhance public acceptance of climate science (though see Clark, Ranney, & Felipe, in press, for promising counter-examples). Instead, emphasis must be on the design of messages that avoid the antagonism arising from worldview or other sources of motivated cognition.

In our first case study, we listed three variables that may help reduce the antagonistic role of worldview when people are presented with threatening messages—framing, choice of messenger, and self-affirmation. We briefly revisit those variables here in the context of climate change before introducing a new one that is unique to scientific issues, namely underscoring the scientific consensus.

*Framing and wording.* As noted earlier, an identical surcharge for carbon-dioxide emissions is more likely to find acceptance among Republicans if it is referred to as an "offset" rather than a "tax" (Hardisty et al., 2010). Similarly, Schuldt, Konrath, and Schwarz (2011) found that Republicans were less likely to endorse the concept of climate change when it was called "global warming" (only 44% acceptance) than when it was referred to as "climate change" (60%). For Democrats, the terminology made no appreciable difference to acceptance (87 vs. 86%).

Although this finding suggests that avoiding the phrase "global warming" can reduce partisan polarization around this issue, adapting the less polarizing phrase may come at a price: Whitmarsh (2009) showed that among her British participants the term "global warming" elicited more concern than the term "climate change," and that the former was more often seen to imply human responsibility than the latter. Use of

"climate change" in preference to "global warming" may thus help reduce partisan polarization, but it may also be received in a less compelling way.

Turning from simple choice of words to a broader perspective, several studies have shown that worldview-borne opposition to environmental protection can be reduced by reframing of the issue. For example, Feygina, Jost, and Goldsmith (2010) observed that individuals with chronically high "system justification" (i.e., a desire to preserve the status quo and the current economic system) tended to reject environmental protection measures and the need to preserve the Earth's resources. However, when environmental protection was presented as "patriotic" and as a way to "protect and preserve the American way of life", even individuals high on system justification measures became likely to endorse environmental protection measures.

There have been numerous other demonstrations that framing is critical to effective communication of climate change and debunking of some commonly-held but mistaken beliefs. For example, worldview-based resistance to climate mitigation measures is firmly entrenched when the solution is presented as "anti-pollution measures," but it is reduced when the solution is presented as increased reliance on nuclear power generation (Kahan, Braman, Slovic, Gastil, & Cohen, 2007; see also Nisbet, 2009). Similarly, Spence and Pidgeon (2010) showed that climate-mitigation measures are endorsed more if the consequences of mitigation are presented as a gain (e.g., "we can prevent further increases in winter floods in maritime regions") than when the lack of mitigation was presented as a loss ("without mitigation … further significant warming will occur"). Maibach, Nisbet, Baldwin, Akerlof, and Diao (2010) likewise showed that most people respond more positively to information about the health *benefits* of mitigation than the health *risks* of unmitigated climate change, and there is broad-based evidence to suggest that the use of a public-health

frame (e.g., "many of the actions that we can take to limit global warming will also make us healthier in a number of other important ways as well") is particularly effective in eliciting support for climate change mitigation (Myers, Nisbet, Maibach, & Leiserowitz, 2012).

*Self-affirmation.* Self affirmation, that is, an opportunity to affirm one's basic values, has been shown to reduce resistance to worldview-dissonant messages relating to climate change (e.g., Nyhan & Reifler, 2011; see also Cohen et al., 2007). Moreover, affirmation-related processes may be particularly relevant to messages surrounding climate change, if the rejection of scientific findings is motivated, in part, by concerns about a conspiracy among scientists. Sunstein and Vermeule (2009) concluded that conspiratorial beliefs should be rebutted by indirect means, such as the affirmation of the competence and character of proponents of such beliefs, or— perhaps ironically—the affirmation of other non-conspiratorial attitudes.

*Underscoring consensus.* Unlike our first case study involving the Iraq war, climate change is an issue in which scientific evidence is paramount. It follows that the public has to rely largely on indirect reports; namely, the opinions of domain experts, to form their own conclusions (cf. Anderson, 2011). Accordingly, the perception of a consensus among scientists has been shown to be an important determinant of the endorsement of climate science (Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011).

The role of perceived consensus appears to be causal: Lewandowsky, Gignac, and Vaughan (2013) showed that if participants are presented with information about the pervasive scientific consensus—viz. that 97 out of 100 climate scientists acknowledge that the globe is warming due to human greenhouse gas emissions— then their acceptance of climate science increases. It is encouraging that in this study

consensus information was particularly effective for people whose free-market

worldview would otherwise predispose them against accepting climate science.

Perceived consensus may therefore constitute a useful variable to reduce the

involvement of worldview in processing of scientific information. Underscoring the

consensus may also present a promising avenue for the correction of climate-related

misinformation; however, the generality of this finding remains to be established (cf.

Kahan, Jenkins-Smith, & Braman, 2011).

*Skepticism and suspicion.* Paralleling our first case study, there is evidence that

people can dismiss misinformation if they are made suspicious of the source of that

information. This can be illustrated by a study by Pfau, Haigh, Sims, and Wigley

(2007), which examined people's acceptance of "astroturfed" information

disseminated by "corporate stealth" groups. ("Astroturfing" refers to the strategy of

presenting a front group as a "grassroots" organization, when in fact the group is

sponsored and directed by parties whose involvement is not immediately obvious.)

Often, such corporate stealth groups act on behalf of corporate sponsors (e.g., the

tobacco industry), while presenting themselves as impartial third parties (e.g., "The

Advancement of Sound Science Center" that was sponsored by the tobacco industry;

Proctor, 2011). There is historical evidence that front groups are also instrumentally

involved in the dissemination of misinformation relating to climate change (e.g.,

Oreskes & Conway, 2010).

Pfau et al. (2007) presented participants with arguments by front groups, such as

arguments *against* legislated litter control measures by a group known as "Keep

America Beautiful," and found those messages to be quite effective: They eroded

public attitudes in favor of litter control and enhanced perception of the front group

itself. However, when the sponsors were exposed (e.g., Pepsi-Cola in this instance),

the attitudinal change associated with the earlier arguments evaporated and the perceptions of both the front group and the corporate sponsor deteriorated. This result is reminiscent of the findings reviewed earlier, which suggested that inducing suspicion about the source of a message is sufficient to cause its dismissal (e.g., among mock jurors; Fein et al., 1997), and it points to a potentially important debiasing tool in the context of climate change.

Pfau et al. (2007) also found that even a generic statement about the prevalence and deceptive nature of front groups, presented at the outset, inoculated participants against an attitude shift in response to the subsequent arguments. Although there is broad empirical support for this inoculation effect (e.g., Ecker, Lewandowsky, & Tang, 2010; for a review see Banas & Rains, 2010), simple source attribution (without explicit warning) appears insufficient to ensure dismissal of "astroturfed" information (Cho, Martens, Kim, & Rodrigue, 2011). It remains to be seen whether inoculation—or the revelation of sponsors behind a front-group—can be successful for messages that are worldview-dissonant; we are not aware of any research that has addressed this question.

## General Discussion

Our two case studies yielded a fairly consistent picture and revealed much overlap between the cognitive processes involved in the processing of (mis-)information and its dismissal, whether it related to the Iraq War or to climate change. In light of the diversity of those two topic areas, the overlap of the underlying cognitive processes is encouraging as it reaffirms the generality of the principles underlying the communication of misinformation and its correction (see Lewandowsky et al., 2012, for a review).

Another aspect of the overlap between the two topic areas deserves comment: In both case studies we found that people's worldview was a major determinant of information processing, with people identifying with more conservative political leanings or preference for unregulated free-markets showing greater reliance on misinformation, and greater resistance to correction. It would be inappropriate to infer from this finding that reliance on misinformation is an exclusive domain of a particular political view: For example, the same study that identified a backfire effect among Republicans when they were informed that no WMD had been found in Iraq (Nyhan & Reifler, 2010) also found that corrections can be ineffective for misperceptions held by people who are politically left of center. Specifically, people on the left continued to believe that President Bush had banned stem cell research, despite being informed that this claim was untrue. Likewise, in another study Nyhan and Reifler (2011) showed that the effects of self-affirmation equally apply to people on the political right and left.

Concerning people's attitudes towards scientific issues, there is also some evidence that worldview effects are not asymmetrical: Lewandowsky, Gignac, and Oberauer (2013) reported the results of a survey that examined Americans' attitudes towards a variety of hotly-debated issues with a scientific underpinning; viz. climate change, childhood vaccinations, and genetically modified (GM) foods. In confirmation of many other findings, free-market worldview and political conservatism were strongly associated with the rejection of climate science, but the role of worldview was more nuanced for vaccinations. On the one hand, people who strongly endorsed free markets tended to reject childhood vaccinations, in confirmation of earlier research that revealed libertarian opposition to HPV vaccinations (Kahan et al., 2010). On the other hand, conservatives were more likely

to accept vaccinations than people on the political left, suggesting that acceptance of scientific findings is not limited to individuals on the political left. (GM foods were not associated with worldview.) In sum, our analysis shows that motivated cognition, be it inspired by worldview of any stripe or by some other variable, is a barrier to belief updating and corrective processing of information.

Conclusion

The principal message of our analyses is that continued reliance on misinformation is not only a matter of individual cognition, whose exploration is of basic scientific interest, but it is also relevant to society at large. We have illustrated the importance of the underlying cognitive processes by showing how the persistence of misinformation in society can contribute to violent conflicts that might otherwise be preventable.

There is little doubt that from the perspective of the "Coalition of the Willing" the Iraq War was a war of choice rather than necessity (Roberts, 2003). Wars of choice are, by definition, preventable: we have shown how understanding the cognition of misinformation and its rebuttal can potentially render conflict more preventable if the public becomes skeptical of possible misinformation.

Equally, there is little scientific doubt that the most adverse consequences of climate change are still reducible by rigorous mitigation (Rogelj, McCollum, Reisinger, Meinshausen, & Riahi, 2013). Given the link between climate change and violent conflict on the one hand, and given the link between climate-disinformation and delay of mitigative action on the other, effective communication of climate science and rebuttal of climate disinformation are therefore arguably tools for the preservation of peace.

There is a potential for our discipline to play a key role in the effort to prevent future wars. One important role for psychology is to help inoculate people against misinformation and disinformation, and to build resilience against narratives that frame conflicts in antagonistic, dehumanizing ways, or that contribute to future conflicts by denying climate change.

References

Abrahamian, E. (2003). The US media, Huntington and September 11. *Third World Quarterly, 24,* 529-544.

Anderegg, W. R. L., Prall, J. W., Harold, J., & Schneider, S. H. (2010). Expert credibility in climate change. *Proceedings of the National Academy of Science, 107,* 12107-12109.

Anderson, E. (2011). Democracy, Public policy, and lay assessments of scientific testimony. *Episteme, 8,* 144-164.

Armstrong, G. M., Gural, M. N., & Russ, F. A. (1983). A longitudinal evaluation of the listerine corrective advertising campaign. *Journal of Public Policy & Marketing, 2,* 16-28.

Artz, L., & Kamalipour, Y. R. (2005). *Bring 'em on: Media and politics in the U.S. war on Iraq*. Lanham, MD: Rowman & Littlefield Publishers.

Auerbach, Y. (2009). The reconciliation pyramid - a narrative-based framework for analyzing identity conflicts. *Political Psychology, 30,* 291-318.

Banas, J. A., & Rains, S. A. A. (2010). Meta-analysis of research on inoculation theory. *Communication Monographs, 77,* 281-311.

Bar-Tal, D. (1998). Societal beliefs in times of intractable conflict: The Israeli case. *International Journal of Conflict Management, 9,* 22-50.

Barthel, F., & Neumayer, E. (2012). A trend analysis of normalized insured damage from natural disasters. *Climatic Change, 113,* 215-237.

Benjaminsen, T. A., Alinon, K., Buhaug, H., & Buseth, J. T. (2012). Does climate change drive land-use conflicts in the Sahel? *Journal of Peace Research, 49,* 97-111.

Bernauer, T., Böhmelt, T., & Koubi, V. (2012). Environmental changes and violent

conflict. *Environmental Research Letters, 7*, 015601.

Bouwer, L. M. (2011). Have disaster losses increased due to anthropogenic climate

change? *Bulletin of the American Meteorological Society, 92,* 39-46.

Boyd, C. D. (2007). Army IO is PSYOP: Influencing more with less. *Military Review,

87,* 67-75.

Boykoff, M. T. (2013). Public enemy No. 1? Understanding media representations of

outlier views on climate change. *American Behavioral Scientist*, *XX,* 1-22. DOI:

10.1177/0002764213476846.

Brulle, R. J., Carmichael, J., & Jenkins, J. C. (2012). Shifting public opinion on

climate change: an empirical assessment of factors influencing concern over

climate change in the U.S., 2002—2010. *Climatic Change, 114,* 169-188.

Central Intelligence Agency, (2005, April 25). *Comprehensive report of the Special

Advisor to the DCI on Iraq's WMD, with addendums (Duelfer Report)*. Retrieved

from

http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=&packageId=GP

O-DUELFERREPORT&fromBrowse=true.

Cho, C. H., Martens, M. L., Kim, H., & Rodrigue, M. (2011). Astroturfing global

warming: It isn't always greener on the other side of the fence. *Journal of

Business Ethics, 104*, 571-587.

Claessen, E. (2007). Discouraging hearts and minds: Democracies and insurgencies.

*Military Review, 87,* 97-103.

Clark, D., Ranney, M. A., & Felipe, J. (in press). Knowledge helps: Mechanistic

information and numeric evidence as cognitive levers to overcome stasis and

build public consensus on climate change. *Proceedings of 35th Annual Meeting of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.

Clarke, R. V., & Newman, G. R. (2009). Reducing the opportunities for terrorism: applying the principles of situational crime prevention. In W. G. K Stritzke, S. Lewandowsky, D. Denemark, J. Clare, & F. Morgan (Eds.), *Terrorism and Torture* (pp. 86-105). Cambridge, UK: Cambridge University Press.

Cohen, G. L., Bastardi, A., Sherman, D. K., Hsu, L., McGoey, M., & Ross, L. (2007). Bridging the partisan divide: Self-affirmation reduces ideological closed-mindedness and inflexibility in negotiation. *Journal of Personality and Social Psychology, 93,* 415-430.

Cook, J., Nuccitelli, D., Green, S. A., Richardson, M., Winkler, B., Painting, R., Way, R., Jacobs, P., & Skuce, A. 2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letters, 8,* 024024.

Darley, W. (2007). The missing component of U.S. strategic communications. *Joint Force Quarterly, 47,* 109-113.

Department of Defense (2000, June). *Joint vision 2020* [Electronic version]. Washington, DC: U.S. Government Printing Office. Retrieved from http://www.dtic.mil/ jointvision/jvpub2.htm.

Ding, D., Maibach, E., Zhao, X., Roser-Renouf, C., & Leiserowitz, A. (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change, 1,* 462-466.

Dispensa, J. M., & Brulle, R. J. (2003). Media's social construction of environmental issues: Focus on global warming – a comparative study. *International Journal of Sociology and Social Policy, 23,* 74-105.

Doran, P. T., & Zimmerman, M. K. (2009). Examining the scientific consensus on

climate change. *Eos, 90,* 21-22.

Dunlap, R. E. (2013). Climate change skepticism and denial: An introduction.

*American Behavioral Scientist, XX,* 1-8. doi: 10.1177/0002764213477097.

Dunlap, R. E., & McCright, A. M. (2011). Organized climate change denial. In

Dryzek, J. S., Norgaard, R. B., & Schlosberg, D. (Eds*.), The Oxford handbook of*

*climate change and society,* (pp. 144-160). Oxford University Press.

Dunlap, R. E., & Jacques, P. J. (2013). Climate change denial books and conservative

think tanks: Exploring the connection. *American Behavioral Scientist, XX,* 1-33.

doi: 10.1177/0002764213477096.

Ecker, U. K. H., Lewandowsky, S., Swire, B., & Chang, D. (2011). Correcting false

information in memory: Manipulating the strength of misinformation encoding

and its retraction. *Psychonomic Bulletin & Review, 18*, 570-578.

Ecker, U. K. H., Lewandowsky, S., & Tang, D. T. W. (2010). Explicit warnings

reduce but do not eliminate the continued influence of misinformation. *Memory*

*& Cognition, 38*, 1087-1100.

Elsasser, S. W., & Dunlap, R. E. (2012). Leading voices in the denier choir:

Conservative columnists' dismissal of global warming and denigration of

climate science. *American Behavioral Scientist,* 1-23.

Esch, J. (2010). Legitimizing the "War on Terror": Political myth in official-level

rhetoric. *Political Psychology, 31,* 357-391.

Fairness and Accuracy in Reporting (FAIR). (2003, March 18). *In Iraq Crisis,*

*Networks are Megaphones for Official Views.* Retrieved from

http://www.fair.org/reports/iraq-sources.html.

Fein, S., McCloskey, A. L. & Tomlinson, T. M. (1997). Can the jury disregard that information? The use of suspicion to reduce the prejudicial effects of pretrial publicity and inadmissible testimony. *Personality and Social Psychology Bulletin, 23,* 1215-1226.

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*, 326-338.

Fox, C. R. & Tversky, A. (1995). Ambiguity aversion and comparative ignorance. *Quarterly Journal of Economics, 110*, 585-603.

Frank, J.D. (1967). *Sanity and survival in the nuclear age*. New York, NY: Random House.

Frey, B. (2004). *Dealing with Terrorism: Stick or Carrot*. Cheltenham, UK and Nothhampton, Mass.: Edward Elgar Publishing

Gartzke, E. (2012). Could climate change precipitate peace? *Journal of Peace Research, 49,* 177-192.

Gleick, P. H. (1989). The implications of global climatic changes for international security. *Climatic Change, 15*, 309-325.

Gleick, P. H. (1993). Water and conflict: Fresh-water resources and international security. *International Security, 18*, 79-112.

Greenberg, J., Knight, G., & Westersund, E. (2011). Spinning climate change: Corporate and NGO public relations strategies in Canada and the United States. *International Communication Gazette, 73,* 65-82.

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, NY: Academic Press.

Hamilton, L. C. (2011). Education, politics and opinions about climate change evidence for interaction effects. *Climatic Change, 104,* 231-242.

Hammack, P. L. (2008). Narrative and the cultural psychology of identity. *Personality and Social Psychology Review, 12,* 222-247.

Hardisty, D. J., Johnson, E. J., & Weber, E. U. (2010). A Dirty word or a dirty world? Attribute framing, political affiliation, and Query Theory. *Psychological Science, 21,* 86-92.

Hart, W. B., II, & Hassencahl, F. (2005). Culture as persuasion: Metaphor as weapon. In L. Artz & Y. R. Kamlipour (Eds.). *Bring 'em on: Media and politics in the Iraq War* (pp. 85-100). Oxford, UK: Rowman & Littlefield.

Hart, P. S., & Nisbet, E. C. (2011). Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. *Communication Research, 39,* 701-723.

Heath, Y., & Gifford, R. (2006). Free-market ideology and environmental degradation: The case of belief in global climate change. *Environment and Behavior, 38,* 48-71.

Hsiang, S. M., Meng, K. C., & Cane, M. A. (2011). Civil conflicts are associated with the global climate. *Nature, 476*, 438-441.

Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science*, Online prepublication only (doi: 10.1126/science.1235367).

Inhofe, J. (2012) *The greatest hoax: How the global warming conspiracy threatens your future.* Washington, D.C.: WND Books.

Intergovernmental Panel on Climate Change (2007). *Summary for policymakers: Contribution of Working Group I to the Fourth Assessment Report of the*

*Intergovernmental Panel on Climate Change*. Technical report.

Jacobson, G. C. (2010). Perception, memory, and partisan polarization on the Iraq War. *Political Science Quarterly, 125*, 31-56.

Jacques, P. J., Dunlap, R. E., & Freeman, M. (2008). The organisation of denial: Conservative think tanks and environmental skepticism. *Environmental Politics, 17*, 349-385.

Kahan, D. M. (2010). Fixing the communications failure. *Nature, 463*, 296-297.

Kahan, D. M., Braman, D., Slovic, P., Gastil, J., & Cohen, G. L. (2007). The second national risk and culture study: Making sense of - and making progress in - the American culture war of fact. *Yale Law School, Public Law Working Paper No. 154.*

Kahan, D. M., Braman, D., Cohen, G. L., Gastil, J., & Slovic, P. (2010). Who fears the HPV vaccine, who doesn't, and why? An experimental study of the mechanisms of cultural cognition. *Law and Human Behavior, 34,* 501-516.

Kahan, D. M., Jenkins-Smith, H.,, & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research, 14,* 147-174.

Kamalipour, Y. R., & Snow, N. (Eds.) (2004). *War, media, and propaganda*. Oxford: Rowman & Littlefield.

Katz, D., & Allport. F. H. (1931). *Student Attitudes*. Syracuse, N.Y.: Craftsman.

Kaufmann, C. (2004). Threat inflation and the failure of the marketplace of ideas. *International Security, 29,* 5-48.

King, S. B. (2011). Military social influence in the global information environment: A civilian primer. *Analyses of Social Issues and Public Policy*, *11*, 1-26.

Krueger, J. (2002). On the reduction of self-other asymmetries: Benefits, pitfalls, and other correlates of social projection. *Psychologica Belgica, 42*, 23-41.

Kull, S. (2007, March 6). America's image in the world [Testimony before House

Committee on Foreign Affairs, Subcommittee on International  Organizations,

Human Rights, and Oversight]. Retrieved from

http://www.worldpublicopinion.org/pipa/articles/views_on_countriesregions_bt/

326.php?nid=&id=&pnt=326&lb=btvoc.

Kull, S., Ramsay, C., & Lewis, E. (2004). Misperceptions, the media, and the Iraq

war. *Political Science Quarterly, 118*, 569-598.

Kull, S., Ramsay, C., Stephens, A., Weber, S., Lewis, E. & Hadfield, J. (2006).

Americans on Iraq: Three years on. *Program on International Policy Attitudes,

0,* 1-19.Kull, S., Ramsay, C., & Lewis, E. (2004). Misperceptions, the media,

and the Iraq War. *Political Science Quarterly, 118*, 569-598.

Lahsen, M. (1999).  The detection and attribution of conspiracies: the controversy

over Chapter 8. In Marcus, G. (Ed.)  *Paranoia Within Reason: a Casebook on

Conspiracy as Explanation* (pp. 111-136). University of Chicago Press.

Lewandowsky, S., Cook, J., Oberauer, K., & Marriott, M. (2013). Recursive fury:

Conspiracist ideation in the blogosphere in response to research on conspiracist

ideation. *Frontiers of Psychology, 4,* 73.

Lewandowsky, S., Ecker, U. K. H., Seifert, C., Schwarz, N., & Cook, J. (2012).

Misinformation and its discounting: Continued influence and successful

debiasing. *Psychological Science in the Public Interest, 13,* 106-131.

Lewandowsky, S., Gignac, G. E., & Oberauer, K. (2013). The role of conspiracist

ideation and worldviews in predicting rejection of science. *PLoS1*, in press

(accepted 19-August-13).

Lewandowsky, S., Gignac, G. E., & Vaughan, S. (2013). The pivotal role of perceived scientific consensus in acceptance of science. *Nature Climate Change, 3,* 399-404

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,* 622-633.

Lewandowsky, S., Stritzke, W. G. K., Oberauer, K., & Morales, M. (2005). Memory for fact, fiction, and misinformation: The Iraq War 2003. *Psychological Science, 16*, 190-195.

Lewandowsky, S., & Stritzke, W. G. K., Oberauer, K., & Morales, M. (2009). Misinformation and the 'War on Terror': When memory turns fiction into fact. In W. G. K. Stritzke, S. Lewandowsky, D. Denemark, J. Clare, & F. Morgan (Eds.), *Terrorism and torture: An interdisciplinary perspective* (pp. 179-203). Cambridge, UK: Cambridge University Press.

Maibach, E., Nisbet, M., Baldwin, P., Akerlof, K., & Diao, G. (2010). Reframing climate change as a public health issue: an exploratory study of public reactions *BMC Public Health, 10,* 299.

Markowitz, E. M., & Shariff, A. F. (2012). Climate change and moral judgement. *Nature Climate Change, 2*, 243-247.

McCauley, C. (2009). War versus criminal justice in response to terrorism: the legal regulation of moral monstrosity. In W. G. K Stritzke, S. Lewandowsky, D. Denemark, J. Clare, & F. Morgan (Eds.), *Terrorism and Torture* (pp. 63-85). Cambridge, UK: Cambridge University Press.

McCright, A. M., & Dunlap, R. E. (2003). Defeating Kyoto: The conservative movement's impact on U.S. climate change policy. *Social Problems, 50,* 348-373.

McCright, A. M., & Dunlap, R. E. (2010). Anti-reflexivity: The American

conservative movement's success in undermining climate science and policy.

*Theory Culture & Society, 27,* 100-133.

McGuire, W. J. (1972). Attitude change: The information processing paradigm. In C.

G. McClintock (Ed.), *Experimental social psychology* (pp. 108–141). New York,

NY: Holt, Rinehart, & Winston.

Mooney, C. (2007). An inconvenient assessment. *Bulletin of the Atomic Scientists, 63,*

40-47.

Munich Re, (2011). *Topics GEO: Natural catastrophes 2010 Analyses, assessments,*

*positions.* Retrieved from http://www.munichre.com/publications/302-

06735_en.pdf

Murphy, D. (2010). Attack or defend? Levering information and balancing risk in

cyberspace. *Military Review, May-June,* 88-96.

Myers, T. A., Nisbet, M. C., Maibach, E. W., & Leiserowitz, A. A. (2012). A public

health frame arouses hopeful emotions about climate change. *Climatic Change*,

*113*, 1105-1112.

Neumayer, E., & Barthel, F. (2011). Normalizing economic loss from natural

disasters: A global analysis. *Global Environmental Change, 21*, 13-24.

Nicholls, N. (2011). Comments on "Have disaster losses increased due to

anthropogenic climate change?" *Bulletin of the American Meteorological Society,*

*92*, 791-793.

Nicholls, R. J., Marinova, N., Lowe, J. A., Brown, S., Vellinga, P., Gusmão, D. de, et

al. (2011). Sea-level rise and its possible impacts given a `beyond 4°C' world in

the twenty-first century. *Philosophical Transactions of the Royal Society (A)*,

369, 161-181.

Nisbet, M. C. (2009). Communicating climate change: Why frames matter for public engagement. *Environment, 51*, 12-23.

Nyhan, B., & Reifler, J. (2010). When corrections fail: The persistence of political misperceptions. *Political Behavior, 32*, 303-330.

Nyhan, B., & Reifler, J. (2011). *Opening the political mind? The effects of self-affirmation and graphical information on factual misperceptions.* Unpublished manuscript.

Nyhan, B., & Reifler, J. (2012). *Misinformation and fact-checking: Research findings from social science*. Technical report. New America Foundation.

O'Loughlin, J., Witmer, F. D. W., Linke, A. M., Laing, A., Gettelman, A., & Dudhia, J. (2012). Climate variability and conflict risk in East Africa, 1990-2009. *Proceedings of the National Academy of Sciences, 109*, 18344-18349.

Oreskes, N. (2004). The scientific consensus on climate change. *Science, 306*, 1686.

Oreskes, N., & Conway, E. M. (2010). *Merchants of doubt*. London: Bloomsbury Publishing.

Pacala, S., & Socolow, R. (2004). Stabilization wedges: Solving the climate problem for the next 50 years with current technologies. *Science, 305,* 968-972.

Pall, P., Aina, T., Stone, D. A., Stott, P. A., Nozawa, T., Hilberts, A. G. J., Lohmann, D., & Allen, M. R. (2011). Anthropogenic greenhouse gas contribution to flood risk in England and Wales in autumn 2000. *Nature, 470*, 382-385.

Paluck, E. L. (2009). Reducing intergroup prejudice and conflict using the media: A field experiment in Rwanda. *Journal of Personality and Social Psychology, 96,* 574-587.

Pfau, M., Haigh, M. M., Sims, J., & Wigley, S. (2007). The influence of corporate front-group stealth campaigns. *Communication Research, 34*, 73-99.

Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S., & Pidgeon, N. F. (2011).

Uncertain climate: An investigation into public scepticism about anthropogenic

climate change. *Global Environmental Change-human and Policy Dimensions,*

*21,* 1015-1024.

Powell, K. A. (2011). Framing Islam: An analysis of U.S. media coverage of

terrorism since 9/11. *Communication Studies, 62,* 90-112.

Prasad, M., Perrin, A. J., Bezila, K., Hoffman, S. G., Kindleberger, K., Manturuk, K.,

& Powers, A. S. (2009). "There Must Be a Reason": Osama, Saddam, and

inferred justification. *Sociological Inquiry, 79*, 142–162.

Proctor, R. N. (2011). *Golden holocaust: Origins of the cigarette catastrophe and the*

*case for abolition*. Berkeley: University of California Press.

Rahmstorf, S., & Coumou, D. (2011). Increase of extreme events in a warming world.

*Proceedings of the National Academy of Sciences, 108,* 17905-17909.

Raleigh, C. & Kniveton, D. (2012). Come rain or shine: An analysis of conflict and

climate variability in East Africa. *Journal of Peace Research, 49*, 51-64.

Rampton, S., & Stauber, J. (2003). *The uses of propaganda in Bush's war on Iraq.*

New York, NY: Tarcher/Penguin.

Reese, S. D., & Lewis, S. C. (2009). Framing the War on Terror: The internalization

of policy in the US press. *Journalism, 10*, 777-797.

Roberts, A. (2003). Law and the use of force after Iraq. *Survival, 45*, 31-56.

Rogelj, J., McCollum, D. L., Reisinger, A., Meinshausen, M., & Riahi, K. (2013).

Probabilistic cost estimates for climate change mitigation. *Nature, 493,* 79-84.

Scales, R. H. (2006) Clausewitz and World War IV. *Military Psychology, 48,* 16-24.

Schär, C., Vidale, P. L., Lüthi, D., Frei, C., Häberli, C., Liniger, M. A., &
Appenzeller, C. (2004). The role of increasing temperature variability in
European summer heatwaves. *Nature, 427*, 332-336.

Schecter, D. (2003). *Embedded: Weapons of mass deception*. Amherst, NY:
Prometheus.

Scheffran, J., & Battaglini, A. (2011). Climate and conficts: the security risks of
global warming. *Regional Environmental Change, 11*, S27-S39.

Schuldt, J. P., Konrath, S. H., & Schwarz, N. (2011). ''Global warming'' or ''climate
change''? Whether the planet is warming depends on question wording. *Public
Opinion Quarterly, 75,* 115-124.

Schwarz, N. (1994). Judgment in a social context: Biases, shortcomings, and the logic
of conversation. *Advances in Experimental Social Psychology, 26*, 123–162.

Scruggs, L., & Benegal, S. (2012). Declining public concern about climate change:
Can we blame the great recession? *Global Environmental Change, 22,* 505-515.

Sherwood, S. C., & Huber, M. (2010). An adaptability limit to climate change due to
heat stress. *Proceedings of the National Academy of Science, 107,* 9552-9555.

Smith, N., & Leiserowitz, A. (2012). The rise of global warming skepticism:
exploring affective image associations in the United States over time. *Risk
Analysis, 32*, 1021-1032.

Socolow, R. (2011). Wedges reaffirmed. *Bulletin of the Atomic Scientists,* (web
edition).

Spence, A., & Pidgeon, N. F. (2010). Framing and communicating climate change:
The effects of distance and outcome frame manipulations. *Global Environmental
Change, 20,* 656-667.

Stocking, S. H., & Holstein, L. W. (2009). Manufacturing doubt: journalists' roles and the construction of ignorance in a scientific controversy. *Public Understanding of Science, 18,* 23-42.

Sunstein, C. R., & Vermeule, A. (2009). Conspiracy theories: Causes and cures. *Journal of Political Philosophy, 17,* 202-227.

Taylor, P. M. (2003). *Munitions of the mind*. Manchester, NH: Manchester University Press.

Theisen, O. M., Gleditsch, N. P., & Buhaug, H. (2013). Is climate change a driver of armed conflict? *Climatic Change, 117*, 613-625.

Tiffen, R. (2009). Reversed negatives: how the news media respond to 'our' atrocities. In W. G. K Stritzke, S. Lewandowsky, D. Denemark, J. Clare, & F. Morgan (Eds.), *Terrorism and Torture* (pp. 246-264). Cambridge, UK: Cambridge University Press.

Todorov, A., & Mandisodza, A. N. (2004). Public opinion on foreign policy: The multilateral public that perceives itself as unilateral. *Public Opinion Quarterly, 68,* 323-348.

Tol, R. S. J., & Wagner, S. (2010). Climate change and violent conflict in Europe over the last millennium. *Climatic Change, 99*, 65-79.

U.S. Senate Select Committee on Intelligence (2006, September 8). *Report of the Select Committee on Intelligence on Postwar Findings About Iraq's WMD Programs and Links to Terrorism and How They Compare With Prewar Assessments*. Retrieved from http://www.intelligence.senate.gov/phaseiiaccuracy.pdf.

Warraich, H., Zaidi, A. K. M., & Patel, K. (2011).  Floods in Pakistan: A public health crisis. *Bulletin of the World Health Organization*, *89,* 236-237.

White, R. K. (1966). Misperception and the Vietnam War. *Journal of Social Issues, 22*, 1-164.

Whitmarsh, L. (2009). Behavioural responses to climate change: Asymmetry of intentions and impacts. *Journal of Environmental Psychology, 29*, 13-23.

Wilkes, A. L., & Leatherbarrow, M. (1988). Editing episodic memory following the identification of error. *Quarterly Journal of Experimental Psychology: Human Experimental Psychology, 40,* 361-387.

Wilkie, W. L., McNeill, D. L., & Mazis, M. B. (1984). Marketing's "Scarlet Letter": The theory and practice of corrective advertising. *The Journal of Marketing, 48,* 11-31.

Woods, J. (2011). Framing terror: an experimental framing effects study of the perceived threat of terrorism. *Critical Studies on Terrorism, 4,* 199-217.

Zhang, D. D., Brecke, P., Lee, H. F., He, Y.-Q., & Zhang, J. (2007). Global climate change, war, and population decline in recent human history. *Proceedings of the National Academy of Sciences, 104*, 19214-19219.

Zhang, D. D., Lee, H. F., Wang, C., Li, B., Pei, Q., Zhang, J., & An, Y. (2011). The causality analysis of climate change and large-scale human crisis. *Proceedings of the National Academy of Sciences*, 108, 17296-17301.

Author Note

Footnotes

[1] People's worldviews are crucial to the issues being examined in this article. In some of the studies we consider, worldviews were measured by questionnaires targeting people's attitudes towards the free market (e.g., Heath & Gifford, 2006) or towards egalitarianism (e.g., Kahan, 2010), whereas other studies classified participants based on their voter registration (i.e., as Republicans, Democrats, or Independents). For present purposes, self-declared party affiliation is taken to be a reliable indicator of worldview, as it is in much other relevant research.

[2] For completeness, it must be acknowledged that the situation is presently less clear for Africa, where initial suggestions that conflicts such as that in Darfur were in part triggered by climate change have turned out to have been premature (e.g., Benjaminsen, Alinon, Buhaug, & Buseth, 2012; see also Bernauer, Böhmelt, & Koubi, 2012, and Theisen, Gleditsch, & Buhaug, 2013). The most recent available work has however reaffirmed the role of climatic factors such as precipitation and temperature in the eruption of conflict (O'Loughlin, Witmer, Linke, Laing, Gettelman, & Dudhia, 2012; Raleigh & Kniveton, 2012).