

A call to arms for climate change? How military service member concern about climate change can inform effective climate communication

Motta, M.; Ralston, R.; Spindel, J.

DOI:

[10.1080/17524032.2020.1799836](https://doi.org/10.1080/17524032.2020.1799836)

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Document Version

Peer reviewed version

Citation for published version (Harvard):

Motta, M, Ralston, R & Spindel, J 2021, 'A call to arms for climate change? How military service member concern about climate change can inform effective climate communication', *Environmental Communication*, vol. 15, no. 1, pp. 85-98. <https://doi.org/10.1080/17524032.2020.1799836>

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A Call to Arms for Climate Change? How military service member concern about climate change can inform effective climate communication

Military service members are a highly trusted group – especially among ideological conservatives. Consequently, we devised an environmental communication strategy that attributes pro-climate messages to military service members, aimed at convincing conservative climate skeptics to express elevated concern. In a large survey experiment, we show that conservatives are more likely to express concern about climate change when framed as a national security concern and communicated by members of the armed services. Supplementary analyses of an original military service member survey suggest that this approach is externally valid, as many past and current armed forces express concern about the effects of climate change. Our study demonstrates the effectiveness of appealing to trusted sources to communicate climate change risks to skeptical audiences and suggests several promising avenues for future environmental communication research.

Keywords: Climate communication, national security, climate opinion, national security attitudes, international relations

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A CALL TO ARMS FOR CLIMATE CHANGE?

Climate change is one of the most pressing policy issues facing the United States. According to a recent report from the Intergovernmental Panel on Climate Change (IPCC), decades of policy inaction now make it all but certain that global temperatures will rise in excess of 1.5°C, increasing the likelihood and severity of coastal flooding and extreme climate-related events like storms, droughts, wildfires (IPCC 2018).

In recent years, the US military has grown increasingly concerned about the effect that extreme climate-related events like these might have on national security. The 2018 National Defense Authorization Act directed the Department of Defense (DoD) to identify the ten military bases most at risk of structural damage due to climate change. The DoD issued a shocking conclusion: according to the report, *more than half* of all US mission-essential military installations are vulnerable to the effects of climate change (Copp 2019).

Concern from military service members about the potentially harmful effects of climate change on U.S. national security could present an effective strategy for communicating the risks of climate change to skeptical groups (e.g., self-identified ideological conservatives). Past and current military service members – who comprise about ten percent of the American public – enjoy broad levels of support in the mass public, often described as uncritical and unwavering (Fallows 2015; Karlin and Friend 2018; Newport 2017; Johnson 2018), especially on the ideological right (Burbach 2018, p. 167; Johnson 2018). Consequently, concern about climate change could foster attention to (or sympathy for) service members' views not just in the population, but for self-identified ideological conservatives; a group that tends to be less likely to accept scientific consensus on the risks and causes of climate change (e.g., Antonio & Brulle 2011; McCright & Dunlap 2011; Brulle, Charmichael, & Jenkins 2012).

In this article, we test the effectiveness of a science communication strategy that relies on military service members to communicate the risks of climate change to skeptical – in this case, ideologically conservative – audiences. We are not the first to document the effect of trusted sources on climate opinion. Instead, our goal is to add to a growing literature aimed at (1) identifying *whom* skeptical audiences trust to provide them with information about climate change, (2) determining whether or not those sources *actually accept* scientific consensus on climate change and (3) using these insights to devise novel (see: 1) and externally valid (see: 2) science communication strategies to increase public concern about climate change.

We begin by reviewing evidence suggesting that the American public (and especially ideological conservatives) place high levels of trust in military service members. We then use this information to devise a science communication strategy – aimed at appealing to ideological conservatives – which attributes claims about the national security risks to military service members. In so doing, we reference supplementary analyses of original survey data, establishing that members of the military, despite their ideologically conservative reputation, believe in anthropogenic climate change and express concern about its effects on national security. These findings lend external validity to our decision to study non-elite military service members as potentially effective communicators of climate change concern.

Critically, we show that, when military service members portray climate change as a national security concern, the public – and especially self-identified ideological conservatives – become more likely to *share* those concerns. In a novel survey experiment (N = 1,703), we find that when members of the armed services (as opposed to climate scientists) frame climate change as a national security concern (as opposed to a domestic and environmental policy concern), self-

identified conservatives tend to indicate higher levels of agreement with scientific consensus on the causes of climate change, and express more concern about its effects.

Climate Change: A National Security Problem

Though the national security implications of climate change are wide-ranging (see, e.g. Ayala 2018; Busby 2008 & 2016; Melton 2019; Shane III 2019), two are especially noteworthy: (1) the flooding of military bases and (2) the effects of climate change on international conflict. Naval bases on coastlines are particularly vulnerable to the effects of major coastal storms, flooding, and rising sea levels often attributed to climate change (see: IPCC 2018). For example, as of 2017, the naval base at Norfolk, Virginia floods ten times per year, and is expected to flood 280 times per year by 2050 due to rising sea levels (Cho 2017).

The other service branches are not immune from these effects. In 1992, Hurricane Andrew damaged Homestead Air Force base in Florida to such an extent that the base never re-opened. Even inland bases are vulnerable to climate-related flooding. In March 2019, Offut Air Force Base in Nebraska flooded, forcing jets to relocate and partially submerging the base's only runway. Offut is home to US Strategic Command, which coordinates US nuclear assets (Martin 2019; Irfan 2019). Bases abroad are also at risk. Among the two-thirds of US military bases vulnerable to current or future flooding are bases at Diego Garcia and Guam (Colgan 2018, p. 34; DoD 2019, p. 16).

Another national security implication concerns increased international conflict. The 2019 Worldwide Threat Assessment, developed by the US intelligence community, stated, "climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources such as food and water" (Nuccitellini

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2019). Food and water insecurity increase the likelihood of armed conflict, including violence against civilians, particularly in many developing countries that are already vulnerable to climate-related crises (Koren and Bagozzi 2016; Koren and Bagozzi 2017). Some scholars have suggested that climate-induced migration will increase conflict in places that receive refugees and migrants (Reuveny 2007; Nordås and Gleditsch 2007). As retired Marine Corps General John R. Allen put it, “Climate change is in many ways a threat multiplier -- amplifying and accelerating the effects of other national security threats” (Allen and Victor 2019).

Correspondingly, military service members are concerned about the effects of climate change on base flooding and international conflict. A recent survey of US military service members ([the authors] 2019), conducted in January 2019, found that nearly two thirds of military service members believe that climate change will cause military conflict over food and water resources, and more than three-fourths believe that climate change will cause damage to US military bases. These findings suggest that efforts to attribute communications about climate change risks to military service members – as we do later on this study – have external validity; as service members are *actually* concerned about climate change. Additional information about [the authors’, 2019] sample and results can be found in the Supplementary Materials.

Translating Service Members’ National Security Concerns Into Effective Climate Communication

High levels of public trust in military service members – combined with service member concern about the effects of climate change on national security – may create a unique opportunity to communicate the risks posed by climate change for climate skeptics, especially on the ideological right. We think that this is likely true for at least two reasons.

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First, previous research suggests that people are more likely to accept persuasive messages when those communications are attributed to trusted sources. Concerning climate change specifically, Benegal and Scruggs (2018) find that conservatives tend to be more receptive to messages about the reality of climate change when that information comes from a like-minded source, speaking out against their partisan interest (see also: Nisbet 2009; Hayhoe, Bloom, & Webb 2019). The idea that trusted “source cues” (Chaiken 1980) can influence climate opinion is consistent with a broader literature suggesting that Americans tend to update opinions about a wide range of policy issues to match those of like-minded partisans (Campbell et al., 1980; Zaller 1992; Berinsky 2009; Lenz 2013). It is also consistent with work which finds that people are more receptive to misinformation correction efforts that originate from trusted sources (Berinsky 2017; Pennycook & Rand 2019).

Consequently, because the military and its service members have a politically conservative reputation (Dempsey 2009; Maniam 2017), and enjoy broad levels of support across the ideological spectrum – especially on the ideological right (Johnson 2018; Pew 2017; Baker Center 2018) – we might suspect that concern about climate change from military service members might encourage self-identified conservatives to express concern about climate change and support pro-climate policies.

Second, when military service members highlight the impact of climate change on national security, service members could galvanize support for climate policy on the ideological right. They could do this either by evoking concerns about national security, which previous research suggests conservatives will find important (Jones 2019), or by evoking concerns about service member safety, which could spur support for climate policy.

Either way, recent advances in social psychological and mass communication research suggest that these concerns could convince climate change skeptics to change their minds. Consistent with insights from construal level theory (CLT; Trope & Liberman 2010), we might expect people to be more likely to endorse scientific consensus on the causes and risks of climate change when they consider climate change to be proximately close in psychological distance; e.g., as a threat to themselves, and/or to groups who they hold in high esteem (see: Brügger 2020 for a review of how CLT has been applied to climate communication research).

Recent work (e.g., Chu & Yang 2019) finds that thinking about climate change at a “proximately close” level evokes emotional experiences (e.g., anger and anxiety) which in turn motivates people to side with scientific consensus. Consequently, service members should be particularly effective at communicating the risks of climate change when they focus on impacts relevant to military service; i.e., national security threats. The national security threats posed by climate change connects climate change risks to service members as a group; thereby engendering support from individuals who feel psychologically close to those groups.

Considering these two expectations (i.e., the effects of trusted source cues & psychological proximity) jointly, we hypothesize that ideological conservatives should be particularly receptive to messages that (1) frame climate change risks as both a national security concern and (2) attribute those claims military service members; compared to messages that do not. Thus, we propose Hypothesis 1:

H1: Self-identified conservatives will be more likely to (A) express concern about climate change; (B) believe that climate change is human-caused; and (C) support pro-climate policies when messages about the risks posed by climate change are attributed to military

service members (as opposed to climate scientists) and focus on national security concerns (as opposed to environmental concerns).

Although we are not aware of any studies linking military service member cues to climate change attitudes, previous work has found that messages originating from military service members can have a considerable effect on whether the public supports the use of force. For example, Golby and colleagues find that Republicans, in particular, take seriously the cues of senior military leaders in experimental settings when considering the use of force and that elite military opinion largely impacts public opinion by increasing (or decreasing) the perceived legitimacy of the mission (Golby, Feaver, and Dropp 2018).

Additionally, a recent study by Bolsen, Kingsland, and Palm (2019) offers an important first step toward understanding the link between climate change, national security threat, and messages from military elites. In an experiment varying the source of messages related to the national security and environmental threats posed by climate change, Bolsen and colleagues find that self-identified Republicans are more likely to view climate change as a national security threat when that threat is communicated by military *leaders* (2019, p. 470).

However, whether or not that strategy extends to *non-elite* members of the military is an open question. To reiterate a point we substantiated earlier, and as we document in the supplemental materials, non-elite members of the military are also concerned about climate change. Given that the public holds U.S. military service members in high regard and trusts them more than other political institutions, we think that they too could serve as effective, yet understudied, climate communicators for skeptical groups. Another reason why a non-elite communication strategy may work is that “surprising” cues often are treated as more credible: “when a cue-giver makes an endorsement that appears to go against type, that cue has a bigger

impact than when a cue-giver seems merely to be expressing an opinion that is expected and therefore already factored into the respondent's calculation on the question" (Golby et al. 2018, p. 48). Given the military's conservative reputation (Dempsey 2009; Maniam 2017) – and because liberals tend to be more likely to express concern about climate change than conservatives (e.g., Brulle et al., 2012) – it may be surprising that members of the military may speak out about the dangers of climate change.. Connecting climate change to national security would further strengthen the legitimacy of such cues to the public. Second, non-elite service members may be seen as less likely to be motivated by political ambitions than senior military officers. In recent elections, Republican and Democratic elites have relied on retired senior military officers as political spokespeople (Barno & Bensahel 2019; Friend 2017). We might therefore expect that such service members are less likely to be seen as having political motivations for speaking out about climate change, and perhaps more credible as a result..

Methods

Data

To test Hypothesis 1, we collected a national sample of US adults via Lucid's "Fulcrum Academic Platform" from May 7 - 8, 2019 (N = 1,702). Respondents were invited to participate in the survey from Lucid's large online opt-in general population panel. The Fulcrum service used quota sampling to reflect known population benchmarks on age, race, sex, educational attainment, income, and geographic region. Although these data are not formally representative of the US adult population, previous research has found that data from Lucid closely resemble Census population benchmarks, and have been shown to replicate the results of well-known

experimental studies (Coppock & McClellan 2019). Table 1 compares our general population sample to known benchmarks for the US adult population.

Table 1

Experimental Design

We designed a survey experiment to test the efficacy of military climate concerns for effectively communicating climate change risks. Specifically, the experiment asks respondents to read one of four short (fictional) op-ed style pieces; all of a similar length, and all formatted in a style analogous to what we might expect to see in an actual newspaper (see the Supplemental Materials for full treatment information).

Each story varies both the source and substance of three efforts to arouse concern about climate change. Our first treatment (“Clim + Sci”) is authored by a climate scientist in *Scientific American*; presenting a “just the facts” take on how human activity is responsible for climate change, highlighting its potential environmental (e.g., extinction) and domestic consequences (e.g., flooding in US cities), and calling for readers to express concern. The second condition (“Nat Sec. + Sci”) is authored by a climate scientist and includes “the facts,” but reframes the information to highlight climate change’s impact on national security (for additional information on how the public perceives climate scientists, see Gauchat, O’Brien, and Miroso 2017; Motta 2018). The third condition (“Clim + Mil”) is authored by a soldier (i.e., not a military elite) who has served in the United States Army for a decade in *The Military Times* —,— and is otherwise analogous to the “Clim + Sci” condition (i.e., it focuses on the environmental consequences of climate change). The fourth condition again originates from a military source, but is otherwise analogous to the “Nat Sec + Sci” condition (i.e., it focuses on the national security consequences of climate change).

It is important to note that opinion pieces written by active duty service members or veterans (like our third and fourth experimental conditions) are not out of the ordinary; thereby lending additional external validity to our experimental design. For example, Brigadier General (Ret.) Stephen A. Cheney penned an op-ed in *The Hill* in 2018 regarding the effects of climate change on national security, emphasizing both the source (military service members) and the consequences (national security) of climate change: “Take it from the military: Climate security is national security” (Cheney 2018; see also Harris 2018; Kline 2014; Lieven 2018).

Fifth, and finally, we include a ‘true’ control condition which asks respondents to read a short story about the history of baseball. The treatments are available in full in the Supplementary Materials, all of which were of a similar length and stylistic format.

Additionally, to increase engagement with the experimental treatments, we prohibited respondents from advancing to the remainder of the survey for at least 20 seconds. On average, across experimental conditions, we find that respondents spent over one minute on the page containing the short op-ed ($M = 73$ seconds), with 70% spending at least 30 seconds on the page.

After being administered one of these four treatments (or the control article), respondents then answered questions about their belief in (and concern about) anthropogenic climate change, their climate policy attitudes, and trust in climate scientists and the military. Our aim is to analyze these treatment effects by comparing anthropogenic climate beliefs, concern, and behavior across conditions, and across different measures of a respondent’s political ideology and trust in the military.

Finally, formal balance tests (available in the Supplementary Materials) suggest that assignment to our experimental conditions did not vary significantly for different demographic groups in our sample. Consequently, all analyses assessing conditional treatment effectiveness

do not include demographic controls (as Mutz 2011 recommends). However, for robustness, Table S4 in the Supplementary Materials re-estimates all models with the inclusion of several demographic controls, and presents an identical pattern of results.

Measures

Concern about Climate Change Effects. The first key outcome variable in testing H1 is the extent to which the public is concerned about the effects of climate change on national security. We measure concern about climate change as a *generalized* phenomenon. This poses a conservative test of H1 because it allows us to see whether or not our experimental manipulations increase public concern about climate change outside of national security concerns. To do this, we administered a slightly adapted version of the `tempgen` question asked regularly in the General Social Survey. Respondents were asked to assess how dangerous “a rise in the world’s temperatures caused by climate change,” is on a scale ranging from 1 (“not at all dangerous”) to 5 (“extremely dangerous”). Because we are conceptually interested in comparing those who express concern about climate change to those who do not, we dichotomized responses such that the variable takes on a value of 1 if respondents view climate change as “very” or “extremely” dangerous, and 0 otherwise (i.e., at the scale’s midpoint or below).

Belief in Anthropogenic Climate Change. A second key outcome variable in testing H1 is the extent to which respondents believe that climate change is caused by human (as opposed to natural) activities. Our study featured a standard item, asked regularly by the Pew Research Center (Funk & Kennedy 2016; see also Motta et al., 2019) pertaining to respondents’ belief in anthropogenic climate change (ACC). Respondents were asked whether or not the planet is getting warmer due to human activity, natural causes, or if there is no solid evidence that the

planet is warming. Respondents were offered an explicit “don’t know” option, as is typical when administering this question. Again, because we are primarily interested in comparing people who accept ACC to ACC skeptics, we dichotomized responses (see Motta et al., 2019), such that a score of 1 indicates believing that climate change is anthropogenic (and 0 otherwise).

Climate Change Mitigation Policy Attitudes. Finally, our third key dependent variable concerns the extent to which respondents support or oppose four climate change mitigation policies (taken from a larger battery designed by Funk & Kennedy 2016); including “restrictions on power plant emissions,” “an international agreement to limit carbon emissions,” “corporate tax incentives” to reduce business’ carbon footprints; and “tougher fuel efficiency standards for automobiles and trucks.” Respondents indicated support on a five-point scale ranging from “strongly oppose” to “strongly support.” For ease of interpretation – and, as we note in the Supplementary Materials (Table S6), because the pattern of results are similar across issues – we combine these four measures into a single additive index using item response theory (see the Supplemental Materials and Figure S2 for more information); rescaled to range from 0 (low support) to 1 (high support).

Symbolic Ideology. Because we expect our experimental treatments to be most effective for ideological conservatives, we interact experimental treatment assignment with a widely-used measure of ideological self-placement on a left-right ideological continuum; sometimes known as “symbolic ideology” (Ellis and Stimson 2012). Respondents indicated their symbolic ideological views on a 5 point scale, ranging from “Very Conservative” to “Very Liberal.”

Results: A New Strategy for Communicating Climate Change Concern to Skeptical Groups

We test our theoretical expectations (Hypotheses 1a-1c) by modeling respondents’ climate change beliefs as a function of their political ideology, experimental condition

assignment, and the interaction between the two. If our theoretical predictions are supported, we would expect to observe a positive and statistically significant interaction between political ideology and assignment to the “Nat Sec + Mil” condition. This would indicate that the (negative) effect of ideological conservatism on climate change attitudes is *attenuated* by the inclusion of military and national security cues; relative to the baseline effect of ideology in the control group, and in comparison to our other experimental treatments.

The results are presented in Table 2. The results provide strong evidence in support of Hypothesis 1a and 1b. We find that the interaction between conservatism and assignment to the “Nat Sec + Mil” condition (bolded) is both positive and statistically significant in the anthropogenic climate change model ($B = 1.63$, $p < 0.05$ *two-tailed*), and approaches conventional levels of significance in the climate change concern model ($B = 1.19$, $p < 0.10$, *two-tailed*). We also find some evidence that the military service member source cue, in conjunction with more generalized warnings about the effects of climate change (i.e. without reference to the national security implications of climate change), is positive with respect to anthropogenic climate change ($B = 1.35$, $p < 0.10$, *two-tailed*); although this result did not hold across models.

Interestingly, we find little evidence in favor of Hypothesis 1c, as none of our experimental treatments appear to move conservative opinion about climate policy. Although we want to refrain from *post hoc* theorizing, it could be the case that – while our experimental conditions did a good job drawing attention to the reality and consequences of climate change – they did not do an adequate job pointing to potential climate *solutions*. Nevertheless, given the well-documented link between beliefs about climate change and support for policy action (e.g.,

Van Boven et al., 2018), we think that these results provide a reason for optimism; a point we take up in greater detail shortly.

Table 2

Of course, the results presented so far provide little sense of the substantive *magnitude* of the experimental effects observed in Table 2. To better illustrate this, Figure 1 plots the predicted probability – expressed as 95% confidence intervals (e.g., Kahan et al., 2017) – of believing that climate change is anthropogenic (left-hand panel), and expressing high levels of concern about climate change (right-hand panel). Results for the control group are presented in grey, while results for the “Nat Sec + Mil” condition are presented in blue.

Figure 1

The results further provide further evidence for Hypotheses 1a and 1b. Strong liberals are highly likely to believe that climate change is human-caused and to express great concern about climate change, irrespective of experimental condition assignment. As conservatism increases, the predicted probability of holding each of these views declines precipitously. However, and consistent with our theoretical expectations, this decline is *significantly more subdued* for conservatives assigned to the “Nat Sec + Mil” condition. This means that conservatives in the “Nat Sec + Mil” condition were significantly more likely than those in the control condition to accept climate change as human caused.

For the strongest self-identified conservatives (the right-hand side of the x-axis), the predicted probability of believing that climate change is human-caused is just 16% in the control condition (gray lines). In the “Nat Sec + Mil” service condition (blue lines), however, that quantity is about 38%; or more than *twice* as high (+22%). We observe a similar pattern of effects for the strongest self-identified conservatives with respect to concern about climate

change for those respondents assigned to the control group (19%) versus the national security + military service condition (31%); although the magnitude of this effect is somewhat smaller (+12%).

The results suggest that it is indeed possible to leverage military service members' concern about climate change into a viable climate change communication strategy. When military service members talk about the effects of climate change on national security, they have the potential to increase conservatives' beliefs in – and concern about – anthropogenic climate change. In addition to its effectiveness at changing climate skeptics' minds, we want to re-emphasize that this communication strategy is also highly realistic; as it reflects military service members' actual concerns (see: [the authors] 2019).

Discussion

In this article, we demonstrate that military concern about the effects of climate change on national security can have a powerful effect on US climate opinion. We find that ideological conservatives – a key climate skeptic group – are more likely to believe in (and express concern about) climate change when military service members express concern about the effects of climate change on national security.

Our work has important implications for US climate politics and policy. Mitigating the effects of a changing climate is likely to be a major domestic and global policy problem in the coming years. Consequently, devising new ways to convince Americans to accept that climate change is real, and to express concern about its effects, may help shore up support for efforts to mitigate climate change, especially amongst climate-skeptic groups in the population.

Our work also advances previous science communication research by offering a generalizable and effective framework for doing precisely this. Our work is not the first to argue

that trusted sources can help communicate climate change risks to skeptical audiences (e.g., Bolsen, Kingsland, & Palm 2019). However, by identifying an under-studied group that a key climate-skeptic demographic (self-identified ideological conservatives) tends to trust (military service members), and an issue of importance to that group (the effect of climate change on national security), we demonstrated the effectiveness of a novel messaging strategy that significantly increased conservative acceptance of and concern about climate change.

In other words, by making an effort to engage climate skeptics on issues that they find important, and from people whom they trust, we were able to reduce reported climate skepticism. We welcome future efforts to test this general approach for other climate skeptic groups, and with other sources and messaging tactics. Future research should test the effects of other trusted groups in society advocating for climate change recognition and mitigation. For example, another group who is consistently rated as ethical and honest by the American people is medical professionals (nurses/doctors) (Brenan 2018). Future research could examine the messaging effects of these trusted professions among climate skeptics on issues related to the effects of climate change on public health and disease.

Relatedly, scholars might consider varying the format in which climate communications like this are presented. This could include varying the medium (e.g., are audio-visual formats vs. written text), narrative (e.g., whether or not communicators share experiences, in narrative form, regarding the negative effects of climate change), and/or the voice (e.g., presentation in the first-person, versus secondary accounts) in which climate change communications are presented. By varying the medium, narrative, and voice, scholars could explore how certain kinds of messages are received and whether such messages are more or less convincing to climate change skeptics.

Further, future research ought to also consider making more of an effort to unpack the psychological mechanisms underlying the results we observe. Theoretically, we drew on construal level theory (CLT) to suggest that fears about the impact climate change might have on a group conservatives hold in high esteem (military servicemembers) might cause conservatives to experience negative emotions, and thereby increase perceptions of climate change risk. Unfortunately, we could not test this mediational relationship in our study. Moreover, we recognize that studies complicate this theoretical view. For example, Rickard, Yang, and Schuldt (2016) find that portraying climate change risks at a close proximal distance is associated with a *decreased* likelihood that conservatives side with scientific consensus. Consequently, we welcome future efforts to experimentally and/or observationally assess the psychological underpinnings of the effects we present.

Of course, we recognize that our study is not without limitations. First, while our messages are able to increase conservative acceptance of, and concern about, climate change, their levels of concern nevertheless fall short of unanimity. It is unrealistic, we argue, to expect that a single messaging tactic can fully resolve ideological disagreements about the reality and gravity of climate change in the mass public. Convincing skeptics to "warm-up" to climate change may require many and varied messaging attempts.

Moreover, we recognize that our survey experimental approach may overestimate the size of the treatment effects we observe. In the "real world," Americans are exposed to many conflicting messaging frames about issues like climate change (Druckman 2010), which may push and pull public opinion in a number of different directions simultaneously and decrease the effect of any one frame in particular. For example, while conservatives may receive messages from the military that climate change is a national security issue, they are likely to receive

simultaneous messaging frames that underplay the threats of climate change from partisan elected officials. Moreover, we asked respondents to provide their opinions about climate change immediately after reading our treatments. In reality, respondents may forget about messages to which they were exposed after just a few days (e.g., Bartels 2002; Hill et al., 2013). In other words, the half-life of a given climate message may be short.

Although it is certainly possible that studies like ours over-estimate media effect sizes, we have nevertheless demonstrated the viability of our procedure for appealing to climate skeptics. Still, questions about effect size magnitude are important. Consequently, we welcome future efforts to observe more-realistic applications of these messages using quasi-experimental and field experimental methods (see: Kalla & Broockman 2016). Does the public respond to the release of Defense Department reports about the severity of climate change? Can a "viral" op-ed penned by a military service member (e.g., Cheney 2018) move conservative opinion about climate change?

Efforts to study the effect of messages that occur organically (i.e., outside of the survey environment) could help provide a more accurate effect size estimate. Additionally, content analytic work could prove useful in identifying whether or not active versus former (veteran) military service members are more likely to pen op-eds like those studied in this research; as the latter group may be less constrained by “chain of command” or political pressures to not speak out on the issue. Content analytic work could also prove useful in identifying *where* op-eds like these are placed; since, as a result of partisan selective exposure (Stroud 2011), self-identified conservatives may be more likely to consult some media outlets in contrast to others. Ultimately, efforts like these could help scholars and practitioners understand the best ways to communicate the dangers of climate change for national security.

Finally, we were, to some degree, surprised to see that our experimental manipulations did not move conservatives' climate *policy* attitudes directly (although it did move their levels of acceptance and concern). However, our work nevertheless has strong policy relevance, as beliefs about climate change are thought to shape climate policy orientations (e.g., Ehret et al., 2018). Although we hesitate to participate in *post hoc* theorizing about this issue, we think that there are several potential explanations for this outcome.

First, we know from classic research in American politics that political ideology tends to be *less* a reflection of Americans' policy stances (Converse 1964) and *more* a summary of their abstract values and group attitudes (Ellis & Stimson 2013; Kinder & Kalmoe 2017). Climate change policy is also a highly technical or "hard" issue (Carmines & Stimson 1980), raising the possibility that Americans have difficulty connecting these positions to their pre-existing political orientations. Thus, it may be the case that our treatments failed to move conservatives' opinions, simply because ideology is less predictive of policy stances than it is more general orientations about the climate. Consistent with this view, we note that the correlation between symbolic ideological self-placement and climate policy support is weaker ($r = -0.25$) than the relationship between ideology and anthropogenic climate change acceptance ($r = -0.37$) or climate change concern ($r = -0.39$).

Second, our study only asked four policy-related questions. As there are many potential ways to combat the effects of climate change (see: Funk & Kennedy 2016), it could simply be the case that our manipulations *would have* moved support on other issues, particularly policy issues more directly tied to military climate change mitigation efforts. We welcome future efforts to expand the policy scope of this work to not just other climate change mitigation policies, but climate change adaptation policies (including policies related to environmental justice) as well.

Finally, it is important to point out that our experimental treatments did not advocate for or against a particular policy. While they encouraged respondents to accept the reality of climate change and express concern about it (both of which they appeared to do successfully), we did not tie the piece to any given policy proposal. Whether or not including this language would actually move opinion is an open question and one we hope scholars will put to the test in the future.

Overall, our work suggests that military concern about climate change is a real – albeit understudied – phenomenon, and messages that appeal to these concerns can help convince ideological conservatives to express higher levels of concern about human-caused climate change. Our study focused on the impact of an op-ed, but future research could examine other mediums – e.g., Defense Department reports, public service announcements – through which to discuss the threat climate changes poses to national security. In practice, our findings suggest that op-eds authored by service members, particularly in outlets commonly read by conservatives, may shift opinion over time. Although our approach is not likely to end ideological disagreement about climate change, we hope that it offers an effective framework for convincing climate skeptics to warm to the reality and gravity of climate change; now, more than ever.

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Table 1. Comparison of Lucid General Population Sample to Known Benchmarks

Demographic	Lucid	Benchmark	Source
Female	51%	52%	CPS 2017
College Degree	43%	30%	CPS 2017
Black	12%	12%	CPS 2017
White	73%	65%	CPS 2017
Hispanic	9%	15%	CPS 2017
Democrat	40%	34%	ANES (Wgt.)
Republican	31%	28%	ANES (Wgt.)
Independent	29%	32%	ANES (Wgt.)
Mean Age	45	47	ANES (Wgt.)
Median Income	\$40-44,999	\$ 55-59,999	ANES (Wgt.)

Note. Comparison of the general population Lucid sample to known population benchmarks. CPS = Current Population Survey (US Census, 2017). ANES = American National Election Study (2016). We prefer to rely on the CPS given its sample size and representativeness, but make use of weighted ANES data whenever it was not possible to use the CPS (e.g., the CPS does not ask questions about partisanship).

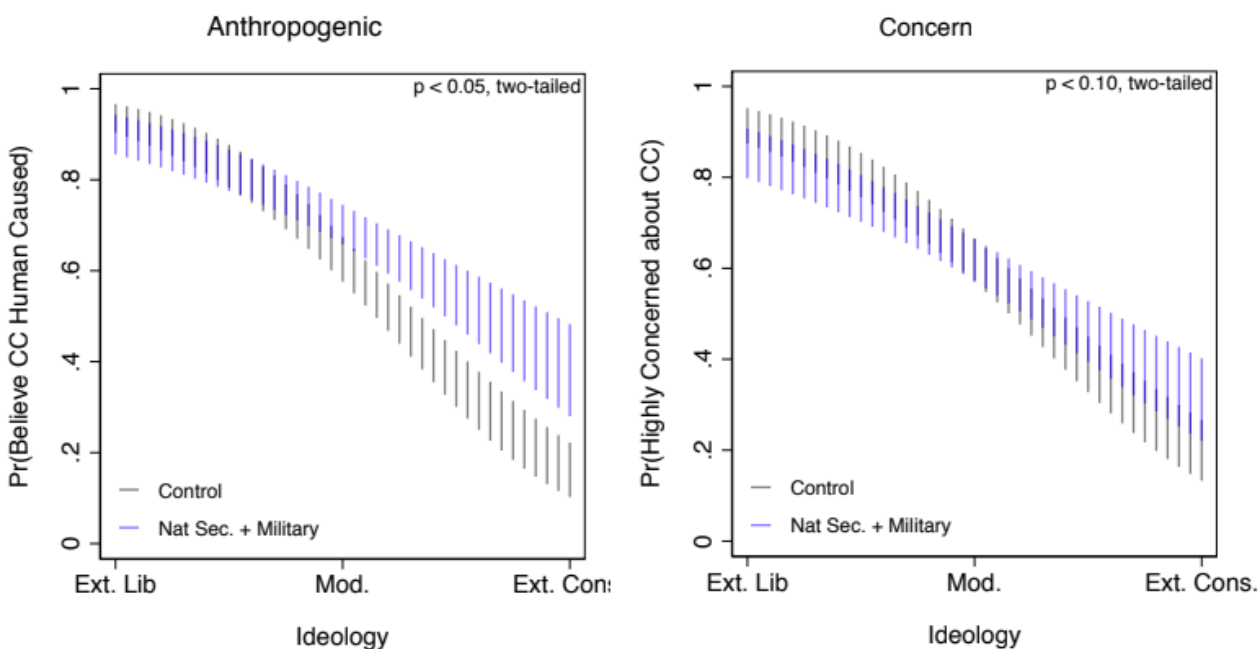
Table 2. The Effect of National Security Issue Framing and Military Service Member Source Cues on Climate Change Attitudes

	Anthropogenic Climate Change (Logistic)	Climate Change Concern (Logistic)	Climate Policy (OLS)
Clim + Mil	-0.49 (0.44)	-0.11 (0.42)	-0.05 (0.03)
Clim + Sci	-0.15 (0.45)	0.11 (0.43)	-0.02 (0.04)
Nat Sec + Mil	-0.47 (0.43)	-0.60 (0.40)	-0.02 (0.04)
Nat Sec + Sci	-0.06 (0.46)	-0.08 (0.42)	-0.02 (0.04)
Conservatism	-4.31** (0.53)	-3.74** (0.49)	-0.36** (0.04)
Clim + Mil X Conservatism	1.35* (0.73)	0.05 (0.72)	0.03 (0.06)
Clim + Sci X Conservatism	1.06 (0.74)	0.09 (0.71)	0.03 (0.06)
Nat Sec + Mil X Conservatism	1.63** (0.72)	1.19* (0.68)	0.01 (0.06)
Nat Sec + Sci X Conservatism	1.19 (0.74)	0.46 (0.71)	0.04 (0.06)
Constant	2.66** (0.32)	2.35** (0.30)	0.87** (0.03)
<u>N</u>	<u>1,700</u>	<u>1,702</u>	<u>1,702</u>

* $p < 0.10$, ** $p < 0.05$; *two-tailed*

Note. Logistic (columns 1 and 2), and OLS (column 3) parameters presented with standard errors in parentheses. Outcome variables are – in order – a binary indicator of whether or not respondents view climate change as primarily human caused (column 1), a binary measure of climate change concern which takes on a value of 1 if respondents view the effects of climate change as “very dangerous” or “extremely dangerous” (otherwise 0), and a quasi-interval level measure of support for climate change policy (scored such that increasing values indicate higher levels of support). The key interaction terms, with respect to Hypotheses 1a-1c are bolded. Raw means on each outcome variable, across ideological subgroups and experimental conditions, are available in Supplemental Table S3. Also note that we re-estimate these results in models that include demographic controls in Table S4 in the Supplemental Materials, where we recover a pattern of effects analogous to those presented here,

Figure 1. The Predicted Effect of the MNS Strategy on Climate Change Attitudes, by Ideology



Note. Predicted probabilities (expressed as 95% confidence intervals) presented. Confidence intervals are one-tailed, as we are engaging in directional hypothesis testing. For reference, however, we present two-tailed p-values above in the upper right-hand corner of each figure. For more information about these models and outcome variables, please refer to Table 1.