Supplemental Materials for Motta, Ralston & Spindel, "A Call to Arms for Climate Change? How Military Service Member Concern About Climate Change Can Inform Effective Climate Communication", *Environmental Communication*, 2020

Contents

Question Wording

Anthropogenic Climate Change Belief

IN BOTH LUCID STUDIES

Q1. Which of these three statements about the Earths temperature comes closest to your view?

<1>TheEarthisgettingwarmermostlybecauseofhumanactivity such as burning fossilfuels
<2>TheEarthisgettingwarmermostlybecauseofnaturalpatterns in the Earth’ s environment
<3> There is no solid evidence that the Earth is getting warmer
<4> Not sure

Climate Change Concern

IN MILITARY LUCID SAMPLES

INTRO:Fromwhatyouhaveheardorread,howlikely,ifatall,areeachofthefollowing to occur because of global climate change?

Q1.USmilitarybasesincoastalorislandregionswillbedamagedbyflooding or severe storms

Q2.Droughtandfaminewillcauseinternationalmilitaryconflictforfoodand water resources

<1>Verylikely
<2> Fairly likely
<3> Not too likely
<4> Not at all likely

IN GENERAL POPULATION LUCIDSAMPLE

In general, do you think a rise in the world’ s temperature caused by climate change is...

<1> Extremely dangerous
<2> Very dangerous
<3> Somewhatdangerous
<4>Notverydangerous
<5> Not at all dangerous

Climate Policy Attitudes

IN GENERAL POPULATION LUCIDSAMPLE

INTRO: Policymakers have considered several proposals to address global climate change. Pleasetelluswhetheryousupportoroppose eachofthefollowingpolicyproposals.

Q1. Restrictions on power plant carbon emissions

Q2. An international agreement to limit carbon emissions

Q3.Corporatetaxincentivestoencouragebusinessestoreducetheircarbonfootprint, that is the amount of greenhouse gas emissions caused by their actions

Q4. Tougher fuel efficiency standards for automobiles and trucks

<1> StronglySupport
<2> SupportSomewhat
<3> Neither Support norOppose
<4> OpposeSomewhat
<5> StronglyOppose

Political Ideology

IN BOTH LUCID STUDIES

Thinking about politics these days, how would you describe your own political views?

<1> Very liberal
<2> Liberal
<3> Moderate
<4> Conservative
<5> Very conservative
<6> Not sure

Military Service Status

IN ALL LUCID MILITARYSAMPLE

Q1. Have you ever been a member of the armed forces?

<1> Yes
<2> No

Notethatrespondentswereaskedmanyadditionalquestionsabouttheirmilitary service, but we rely only on this one in our study.

Experimental Treatments

CONDITION: Military Cue + National Security

Please read the following op-ed from US soldier Alex Brady, published in the Military Times in November 2018. Brady is a ten-year veteran of the US army and has served two tours in Afghanistan.

Trust the Military: Climate Change is Threatening Our National Security and We are to Blame

As a soldier in the United States Army, I believe that humans are responsible for climate change and it is dangerous to our national security. Heres what the best available research from the Department of Defense has to say about climate change and its impact on our nations security.

Up until about 150 years ago, human activity did not produce many greenhouse gases. That changed as important inventions and industrial innovations, like the widespread use of electricity and cars, transformed the way we live. These inventions and innovations demand energy. Burning fossil fuels coal, oil, and natural gas has become an important source of that energy.

Burning fossil fuels releases carbon dioxide and other greenhouse gases into the atmosphere. Greenhouse gases, act like a blanket, trapping heat near the surface and raising the temperature. It is a natural process that warms the planet. But human activities are increasing the amount of greenhouse gases and trapping more heat. Multiple studies conducted by the Department of Defense show that climate-warming trends over the past century are extremely likely due to human activities and threaten our national security. For example, a recent Pentagon report reveals that more than two-thirds of critical military bases are threatened by the effects of climate change over the next 20 years, including repeated flooding and wildfires.

Americans, irrespective of political ideology or creed, should listen to the military, my fellow service members, and the Department of Defense. In my view, its time to be concerned about the role that humans are playing in warming up our planet and its effect on the security of our country before it is too late.

CONDITION: Military Cue + Environmental Harms

Please read the following op-ed from US soldier Alex Brady, published in the Military Times in November 2018. Brady is a ten-year veteran of the US army and has served two tours in Afghanistan.

Trust the Science: Climate Change is Hurting Our Planet, and We are to Blame

As a soldier in the United States Army, I believe that humans are responsible for climate change. Heres what the best available science has to say.

Up until about 150 years ago, human activity did not produce many greenhouse gases. That changed as important inventions and industrial innovations, like the widespread use of electricity and cars, transformed the way we live. These inventions and innovations demand energy. Burning fossil fuels coal, oil, and natural gas has become an important source of that energy.

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Americans, irrespective of political ideology or creed, should listen to the science. In my view, its time to be concerned about the role that humans are playing in warming up our planet before it is too late.

CONDITION: Scientist Cue + National Security

Please read the following op-ed from Dr. Alex Brady, published in Scientific American in November 2018. Dr. Brady is a scientist at NASA who specializes in the study of climate change.

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CONDITION: Control (The History of Baseball)

Please read the following passage.

The History of Baseball

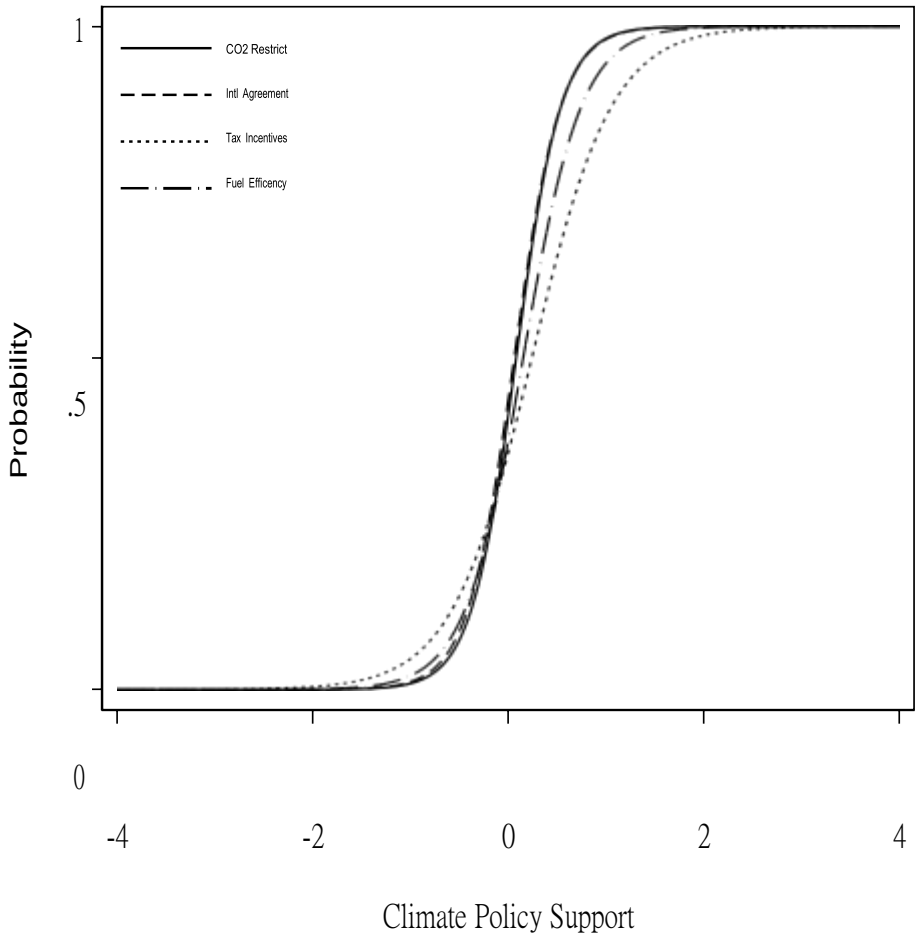
Baseball originated before the American Civil War (1861-1865) as rounders, a humble game played on sandlots. Early champions of the game fine-tuned it to include the kind of skills and mental judgment that made cricket respectable in England. The movement of Union soldiers during the Civil War helped to spread the game, and increased opportunities for leisure, improved communications, and easier travel after the war fostered a wider competitive base and increased interest.

In 1871 the first professional baseball league was born. By the beginning of the 20th century, most large cities in the eastern United States had a professional baseball team. The teams were divided into two leagues, the National and American; during the regular season, a team played only against other teams within its league. The most victorious team in each league was said to have won the Pennant.

The two pennant winners met after the end of the regular season in the World Series. The winner of at least four games (out of a possible seven) was the champion for that year. The first World Series between the champions of the two major leagues was held in 1903, and by 1905 it became an annual event.

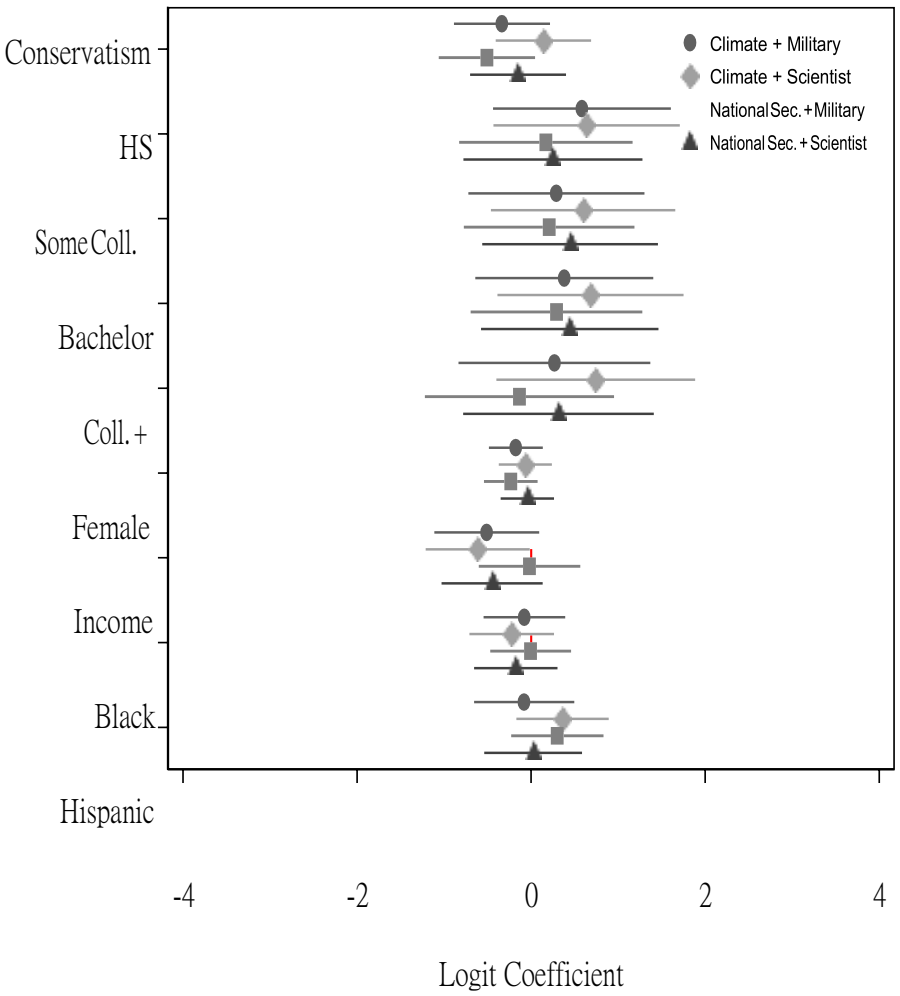
Supplemental Figures

Figure S1. Item Characteristic Curves for Climate Policy Outcome Variable



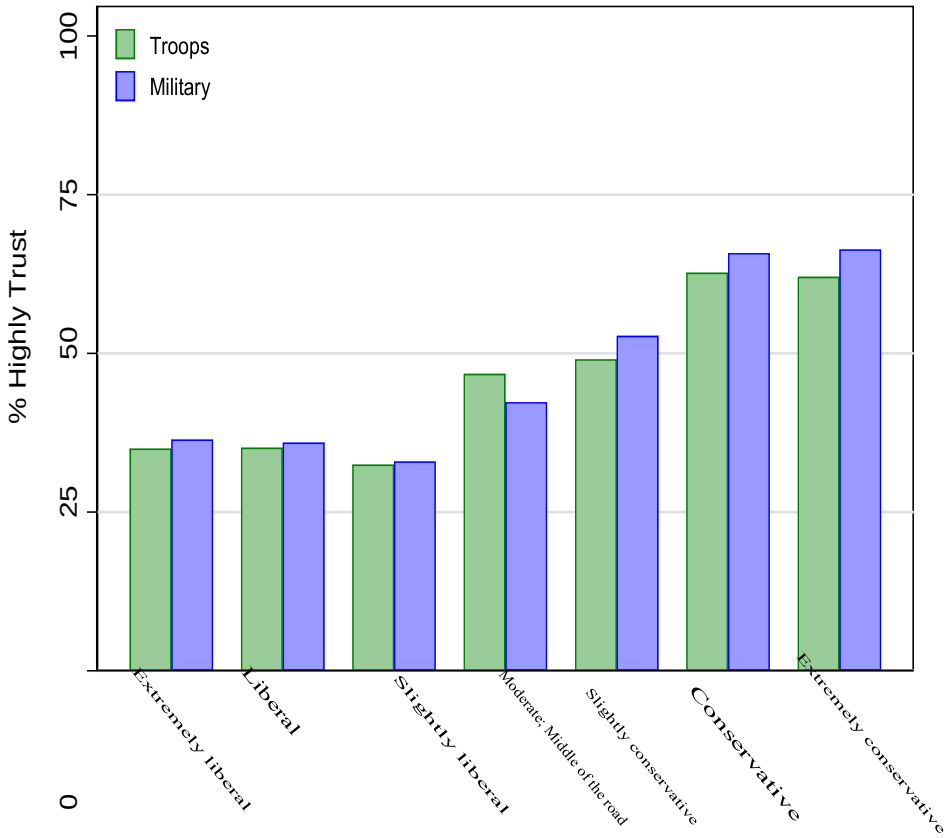
Note. Figure presents category characteristic curves resulting from a graded item response model (i.e., an application of item response theory that is appropriate for ordinal data). Curved lines correspond to the probability (y-axis) of earning a certain score on estimated latent climate policy support (x-axis), for those who indicate the highest levels of support on each item. Steep, s-shaped curves indicate that individuals who do not support each particular policy have a very low probability of earning a high score on the latent policy support dimension, while those who support each policy have a very high probability of earning a high score. Additional information about the items used to build this scale can be found in the Question Wording subsection of the Supplemental Materials.

Figure S2. Balance Tests for Study 2 (Experimental Condition Assignment)



Note. Shaded shapes correspond to logistic regression coefficients (with 95% confidence intervals extend- ing out from each one) from regression models that model assignment to each experimental condition (vs the control) as a function of each listed demographic factor on the right-hand side of the figure. The figure presents two key findings. First, the composition of the sample subgroups assigned to each condition do not differ significantly from those assigned to the control group in any case (i.e., each parameter' s 95% confidence intervals intersect the dashed red 0 line). Second, we find no significant differences *across treatment groups* (and relative to the control in any case (i.e., all parameter' s 95% confidence intervals overlap with one another).

Figure S3. A Profile of Military and Service Member Trust, by Ideology (Study 2, Lucid Data)



Note. Bar graph presents the percentage of respondents in each ideological subgroup who place a high level of trust in military service members (in green) and military institutions more broadly (in blue). Although more than a third of each ideological subgroup places high levels of trust in both the military and service members, conservatives tend to place higher levels of trust in both groups. This provides additional evidence in favor of our hypothesized mechanism in Study 2; i.e., that conservatives are more likely to respond positively to communication originating from military sources (and focusing on military issues) because they tend to be highly deferential and trusting of those groups.

Supplemental Analyses – Service Member Views

Although scholars know quite a bit about what military elites think about climate change, we know comparatively little about what military service members' opinions. Addressing this shortcoming has important implications for science communi3cation efforts to boost public concern about climate change.

We think that military service members have the potential to be effective communicators about climate change risks. However, whether or not this approach is credible (i.e., externally valid) hinges on whether or not military service members are actually concerned about climate change, and its effects on national security. Thus, we pose the following research question: Are current and former members of the military concerned about the consequences of climate change, and how does such concern--or lack thereof--compare to the general population?

Given their ideologically conservative reputation, some might expect military service members to express low levels of concern about climate change. Although we recognize this possibility, we argue that there are at least two reasons to think that service members – despite their conservative reputation – may nevertheless express concern about climate change risks.

First, members of the military may have (or have had) direct experience with the consequences of climate change while serving. For example, they may have served on a base that has been subject to increased flooding. Second, given the hierarchical nature of the military as an institution (Huntington 1957), we might expect members of the military to take the warnings from the Department of Defense and military officials seriously. This deference could outweigh any prior personal beliefs they may have had regarding the causes or consequences of climate change or conflicting narratives from political elites, pundits, and other voices.

We collected a targeted sample of both active duty and veteran military service members via Lucid in January 2019 (N = 293). Lucid sent invitations to a pool of opt-in online survey respondents – recruited via third party marketing platforms – who identified on an initial inventory survey as former or current members of the US military. Additionally, to ensure that the respondents are (or were former) members of the military, we asked two screening questions that are very difficult to quickly find the answers to on the internet, but yet are considered general knowledge among military members.88% of respondents answered the first question, "What is the acronym for the locations where final physicals are taken prior to shipping off for basic training," correctly, while 93% of respondents answered the second question, "what is the acronym for the generic term the military uses for various job fields," correctly.

While this sample is not perfectly representative of the military writ large, it is both ideologically and demographically diverse. Table 1 compares our data to known sub-population benchmarks. Critically, even though our sample over-represents women in the armed services – which, given the link between gender and support for the Democratic party, we might worry may lead to an over-estimation in climate

change concern – it nevertheless closely matches known benchmarks on partisan identification. Our sample closely resembles known service member benchmarks on age, race, educational attainment, and military rank. 62% of our sample self-report as veterans, while 38% self-report as active-duty service members.

Despite their ideologically conservative reputation, we find that a plurality of service members (43 percent) believe that the Earth is getting warmer mostly because of human activity such as burning fossil fuels. Moreover, as Table 2 shows, an additional 32 percent acknowledge that the Earth is getting warmer but believe that it is mostly because of natural patterns in the Earth's environment. Just a small minority (12 percent) of service members believe that there is no solid evidence that average global temperatures are on the increase.

We turn next to respondents' levels of concern about the effects of climate change on national security. If respondents answered that the Earth is getting warmer, we then asked how likely it is that "U.S. military bases in coastal or island regions will be damaged by flooding or severe storms" and that "Drought and famine will cause international military conflict for food and water resources." A substantial majority of military respondents (around 77 percent) believe that it is "very likely" or "fairly likely" that US military bases in coastal or island regions will be damaged by flooding or severe storms. Additionally, about 61 percent of military respondents also believe that it is "very likely" or "fairly likely" that drought and famine will cause international military conflict for food and water resources.

Overall, our preliminary descriptive results suggest that a plurality of military service members believe in anthropogenic climate change, and large majorities are concerned about the effects that climate change might have on national security. This adds an important element of credibility to strategic communication efforts that leverage widespread military climate concerns in order to increase public concern about climate change, and support for climate change mitigation policies. In what follows, we assess the efficacy of this approach.

Table S1. Comparison of the Lucid Service Member Sample to Known Benchmarks

Demographic	Lucid	Benchmark	Benchmark Source
Female	41%	15%	DoD 2015
College	29%	21%	DoD 2015
Black	19%	17%	DoD 2015
White	65%	71%	DoD 2015
Hispanic	6%	12%	DoD 2015
Democrat	21%	20%	Pew Research
Republican	32%	29%	Pew Research
Independent	47%	49%	Pew Research
Age 18-29	28%	44%	Pew Research
Age 30+	72%	56%	Pew Research
Rank (Enlisted)	93%	82%	DoD 2015
Rank (Officer)	6%	18%	DoD 2015

Note. Comparison of our military population Lucid data from Study 1 (column 2) to known sub- population benchmarks. DoD = 2015 Department of Defense "Profile of the Military Community" study http://download.militaryonesource.mil/12038/MOS/Reports/2015-Demographics-Report.pdf. Pew = Pew Fact Tank 2017 profile of military veterans; https://www.pewresearch.org/fact-tank/2017/05/26/u-s-veterans-are-generally-supportive-of-trump/

Table S2. A Descriptive Profile of Service Members' Views on Climate Change

Climate Change Belief	% who endorse
Caused by Human Activity	43.34
Caused by Natural Patterns	32.08
No Evidence of Warming	12.29
Not Sure	12.29
National Security Threat	**% who indicate "Very" or "Fairly" likely to occur**
US military bases in coastal or island regions will be damaged by flooding or severe storms.	77.38
Drought and famine will cause international military conflict for food and water resources.	61.09

Note. Data are derived from our Lucid military sub-population sample (N = 293). Please refer to Table 1 for additional information about the composition of this sample.

Table S3. Mean Scores on Each Outcome Variable Tested in Table 2, across Experimental Conditions and Ideological Subgroups.

	ACC Beliefs		CC Concern		Clim. Policy	
	Libs	Cons	Libs	Cons	Libs	Cons
Control	0.88 [0.76, 0.90]	0.34 [0.25, 0.42]	0.86 [0.80, 0.93]	0.34 [0.26, 0.43]	0.77 [0.77, 0.84]	0.58 [0.54, 0.64]
Clim + Sci	0.86 [0.80, 0.93]	0.46 [0.37, 0.55]	0.86 [0.79, 0.93]	0.35 [0.27, 0.44]	0.80 [0.75, 0.84]	0.57 [0.53, 0.61]
Clim + Mil	0.81 [0.74, 0.88]	0.46 [0.37, 0.56]	0.81 [0.74, 0.88]	0.39 [0.30, 0.49]	0.76 [0.71, 0.80]	0.57 [0.52, 0.62]
Nat Sec + Sci	0.83 [0.72, 0.88]	0.51 [0.41, 0.60]	0.81 [0.72, 0.88]	0.39 [0.30, 0.48]	0.79 [0.75, 0.83]	0.58 [0.54, 0.63]
Nat Sec + Mil	0.89 [0.83, 0.94]	**0.55** [0.44, 0.65]	0.80 [0.72, 0.87]	**0.42** [0.32, 0.52]	0.79 [0.75, 0.83]	0.57 [0.52, 0.62]

Note. Mean scores on the anthropogenic climate change (ACC), climate change concern (CC Concern), and climate policy (Clim. Policy) outcome variables presented, with 95% confidence intervals in parentheses. Means are presented across *pooled* ideological sub-groups. This means that the mean estimates for liberals ("Libs") includes all self-identified liberals irrespective of ideological strength, and *vice versa* for conservatives ("Cons.").

Table S4. Re-estimation of Table 2 with Demographic Controls

DV =	ACC Belief	CC Concern	Clim. Policy
Clim + Mil	-0.51	-0.09	-0.04
	(0.44)	(0.42)	(0.04)
Clim + Sci	-0.17	0.11	-0.01
	(0.46)	(0.44)	(0.04)
Nat Sec + Mil	-0.47	-0.58	-0.01
	(0.43)	(0.40)	(0.04)
Nat Sec + Sci	-0.04	-0.05	-0.01
	(0.46)	(0.42)	(0.04)
Conservatism	-4.31**	-3.69**	-0.35**
	(0.53)	(0.50)	(0.04)
Clim + Mil X Conservatism	1.40*	0.09	0.02
	(0.73)	(0.72)	(0.06)
Clim + Sci X Conservatism	1.03	0.06	0.01
	(0.74)	(0.72)	(0.06)
Nat Sec + Mil X Conservatism	1.61**	1.18*	0.00
	(0.73)	(0.68)	(0.06)
Nat Sec + Sci X Conservatism	1.10	0.37	0.02
	(0.75)	(0.71)	(0.06)
HS Grad	0.68*	0.50	0.06
	(0.38)	(0.38)	(0.04)
Some College	0.94**	0.72*	0.09**
	(0.37)	(0.37)	(0.04)
College Grad	0.76**	0.72*	0.10**
	(0.38)	(0.37)	(0.04)
College +	0.82**	0.73*	0.08*
	(0.41)	(0.41)	(0.04)
Gender = Female	0.16	0.22*	0.06**
	(0.11)	(0.11)	(0.01)
Household Income	0.03	-0.09	0.03
	(0.22)	(0.22)	(0.02)
Race = Black	0.01	-0.01	-0.04**
	(0.18)	(0.17)	(0.02)
Race = Hispanic	0.16	0.21	-0.02
	(0.21)	(0.20)	(0.02)
Constant	1.77**	1.57**	0.75**
	(0.48)	(0.46)	(0.05)
N	1681	1683	1683

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

Note. Please see the note accompanying Table 2 in the main text for additional information about these models. Models presented here control for respondents educational attainment (binary indicators of whether or not respondents graduated from high school, attended some college, graduated from college, or earned a higher/professional degree), gender (a binary indicator of whether or not respondents are women), household income (an 24 point scale ranging from making less than $15,000 per year, to making $250,000 or more), and race (binary indicators of self-identifying as Black [Non-Hispanic] or Hispanic).