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Social vigilantism and the extremity, superiority, and defense of attitudes toward climate change

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ABSTRACT

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Public polarization toward the issue of climate change has increased in recent years. SV is the extent to which individuals believe their opinions are superior to others' and should be impressed onto others. We assert social vigilantism (SV) may provide important explanation of attitudes toward, as well as the resistance to and perceptions of those who challenge individuals' attitudes toward, climate change. SV has been previously shown to predict more extreme attitudes toward climate change and other political issues. We found SV predicted the extremity, strength, and superiority of attitudes toward climate change, and resistance to attitude challenges (Study 1). We then manipulated whether an individual agreed or disagreed with the participant in a vignette and measured participants' perceptions of the other individual. We found higher levels of SV were associated with more positive perceptions of the other individual (Study 2). Interestingly, this finding was independent of whether the other individual agreed with or disagreed with the participant. This may be because the other individual was still discussing political issues, providing participants the opportunity to impress their own beliefs. These findings may indicate future discussions about climate change, while contentious and sometimes hostile, may inspire respect, even for opposing viewpoints.

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1. Introduction

1.1. The climate change debate

Despite an overwhelming convergence of evidence from the scientific community (e.g., Cook et al., 2013, 2016), the existence of climate change is an environmental phenomenon that has transcended scientific debate. Some prominent politicians and others have argued that climate change is not occurring, and even if it is, it is not a product of human behavior, and therefore cannot be resolved by changes in human behavior (Bolsen, Druckman, & Cook, 2015). Scientists and prominent politicians on the other side of the debate argue that climate change is real, it is occurring, and is a direct product of human behavior (Bolsen et al., 2015). These debates are contentious and driven by more than the comparison of contrasting research findings. Interestingly, recent research presented at the Society for Personality and Social Psychology Group Processes and Intergroup Relations preconference (Wilson, 2018) suggests these debates may be fueled at least in part by false polarization, with individuals on either side perceiving the opposing viewpoints as more extreme and contentious than they actually are, inciting increased resistance. This is likely due to the debates having been framed to advance highly invested viewpoints including moral, political, and even religious agendas (Borick & Rabe, 2010; Hart & Nisbet, 2012; Weber & Stern,

2011). Thus, research on climate change polarization is timely and the current studies may help explain both false and real polarization as well as attitudes toward individuals who hold similar and opposing viewpoints.

Climate change is an important political topic and one that has produced much polarization, even in the face of scientific evidence, in the United States of America (Lee, Markowitz, Howe, Ko, & Leiserowitz, 2015; Wike, 2016). It was previously thought that, as public knowledge of climate change increased, public opinion would approach scientific consensus. However, public polarization toward the issue has increased in recent years (see Dunlap, McCright, & Yarosh, 2016), possibly due to biased assimilation of new scientific findings or arguments (Braman, Kahan, Peters, Wittlin, & Slovic, 2012; Hart & Nisbet, 2012; Weber & Stern, 2011). Interestingly, when presented with evidence that is backed by the majority of scientists, people on either side of the debate tend to shift their views toward the scientific consensus and polarization on issues can weaken with the majority of people indicating endorsement in the belief that climate change exists (e.g., van der Linden, Leiserowitz, & Maibach, 2018). However, even when presented with evidence, or especially if there is lower scientific consensus (e.g., the role of humans in global warming), polarization remains. We assert this polarization, the resistance to persuasion, and even perceptions of individuals holding opposing viewpoints (even in the face of contradictory evidence) may be partially explained by individual differences, especially those that "incite anger and social action" in groups (see Saucier, Webster, O'Dea, & Miller, 2017).

As the debate about climate change extends beyond the simple report and evaluation of evidence, individual differences have influ-

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enced the positions individuals take in this debate. Research has shown individual differences in belief superiority, conservatism, political ideology, political party identification, and certainty impact perceptions and extremity of climate change attitudes (Corbett & Durfee, 2004; Raimi & Leary, 2014; Sarge, VanDyke, King, & White, 2015). That is, the debate about climate change, and the beliefs and opinions on which the debate is founded, are rooted in aspects of the individuals, and not merely the evaluation of evidence. Consequently, conflicts between individuals and groups emerge with little hope of objective resolution. That said, even though we have focused on climate change and use extant literature related to climate change to justify climate change as a polarizing issue in the United States of America (where the current studies were conducted), the hypotheses of our current studies can be extended to other environmental or controversial issues for which polarization and political discourse are present. The predicted impacts of individual differences related to resistance to persuasion on polarization and attitude strength toward political issues, including environmental issues, are discussed below.

1.2. Social vigilantism and resistance to persuasion

We contend social vigilantism (SV) is an individual difference that will provide information about the attitudes, social interactions, and group divisions that surround the climate change debate. Whereas a vigilante is “one of an organized group of citizens who take upon themselves the protection of their district, properties, etc.” (dictionary.com), SV is an individual difference characterized by the tendency to believe one's own opinions are superior to those of others, to resist persuasion, and to attempt to impress one's own opinions onto others (Saucier & Webster, 2010). SV can be measured reliably and validly by the Social Vigilantism Scale (Saucier & Webster, 2010). Scores on the measure are internally consistent and stable over time. Further, individual differences in SV are associated with responses to the presentation of extreme political opinions, with higher levels of SV being associated with more expressions of belief superiority and counterarguing in response to extreme political opinions (Saucier & Webster, 2010). Higher levels of SV are also associated with resistance to persuasion when individuals' attitudes about sex education in schools (Saucier & Webster, 2010), abortion, the war in Iraq, and the first amendment rights of pornographers (Saucier, Webster, Hoffman, & Strain, 2014) are challenged. SV predicts these responses and resistance to persuasion above and beyond other individual differences such as dogmatism, narcissism, moral stability, need for cognition, and reactance (Saucier & Webster, 2010) as well as individuals' levels of argumentativeness, individuals' levels of attitude strength regarding the issue being challenged, and the importance of the issue being challenged (Saucier et al., 2014).

1.3. Social vigilantism and attitudes toward climate change

While the extant research has primarily examined social and political attitudes, researchers have begun to examine whether SV relates to participants' extremity and strength of attitudes toward many different environmental issues. In a study examining belief superiority in terms of individuals' attitudes about environmental issues, SV was positively correlated with belief superiority for attitudes about all ten of the environmental issues assessed as well as attitudes attitude strength toward environmental issues (e.g., fracking, offshore drilling; Maki & Raimi, 2017; Raimi & Leary, 2014).

The research on SV to date converges to demonstrate individual differences in SV are associated with how strongly individuals hold

their attitudes and how resistant those attitudes are to challenges. These relationships have been shown with political and social attitudes, but also with environmental attitudes generally, and specifically with attitudes related to climate change. Consequently, replicating the studies by Maki and Raimi (2017) and Raimi and Leary (2014), in Study 1 we hypothesized individuals' levels of SV would predict the extremity and strength of individuals' attitudes toward climate change. Krosnick, Boninger, Chuang, Berent, and Carnot (1993) compiled a list of attitude strength dimensions. For the current study we were interested in examining the relationships between SV and six of these dimensions including certainty (how certain people are of their beliefs), importance (how personally important these beliefs are), knowledge (how much knowledge they have on the topic), intensity (how strong these beliefs are), interest (how much an individual seeks to acquire knowledge on the topic), and accessibility (how much an individual *talks* about or *thinks* about a topic).

Further, replicating research by Saucier et al. (2014) and O'Dea et al. (submitted), we predicted that SV would predict individuals' use of resistance strategies in response to challenges to their attitudes about climate change. Jacks and Cameron (2003) identified seven resistance strategies that individuals can use when engaging in interpersonal debates. These resistance strategies include attitude bolstering (finding information that supports one's beliefs), assertions of confidence (stating one's beliefs cannot be changed), counterarguing (directly refuting the opposition's arguments), social validation (seeking approval from others), selective exposure (leaving the conversation either literally by walking away or just ignoring the opposition), negative affect (getting upset or angry), and source derogation (directly insulting the opposing individual). Saucier et al. (2014) expanded this list to include one additional resistance strategy, impressions of beliefs (the need to push one's own beliefs onto others).

Little research has examined whether SV predicts perceptions of individuals on the opposing side versus same side in a debate. Because arguments or debates are often contentious, we examined whether SV predicts perceptions of individuals engaged in a debate. Specifically, extending previous research, in Study 2, we predicted that SV would predict perceptions of individuals who challenge (versus agree) with one's attitudes about climate change. Specifically, we predicted that individuals higher in social vigilantism will hold more extreme views of climate change (either for or against the existence), engage in more strategies to resist persuasion, and perceive individuals who disagree with them less positively (i.e., less warm, communal, agentic, and competent), while perceiving individuals who agree with them more positively (i.e., more warm, communal, agentic, and competent; see Eagly & Crowley, 1986). This research will contribute to the extant literature by establishing SV as an important individual difference that may illuminate the cognitive, affective, behavioral, interpersonal, and group processes that occur in the context of discussions and debates about controversial environmental topics like climate change. Because this controversy involves both individuals and groups, and has resulted in social conflict, illuminating these processes is a worthwhile goal with implications for discussions and interpretation of scientific findings and controversies about other environmental issues.

2. Study 1

In Study 1, we conducted a correlational study in which we examined whether SV related to the extremity of individuals' attitudes toward climate change. Consistent with previous research (e.g., Saucier et al., 2014), we hypothesized individuals' levels of SV would be positively correlated with the extremity of their attitudes toward climate

change, but not with the direction of their attitudes (i.e., whether they believed in or were skeptical about climate change). Further, we examined whether individuals' levels of SV would relate to their reports they would use strategies to resist persuasion as described by Jacks and Cameron (2003) in response to challenges to their attitudes toward climate change. Consistent with past research (e.g., Saucier et al., 2014), we predicted higher levels of SV would be associated with individuals' greater reports they would use each of the resistance strategies identified by Jacks and Cameron (2003) in response to challenges to their attitudes toward climate change.

2.1. Method

2.1.1. Participants

A total of 305 United States-based participants accessed our survey via Amazon's Mechanical Turk software. Participants who did not take at least 2 s per item (48; Curran, 2016), and participants who did not complete the full survey (18) were removed from analysis. Of the 239 remaining participants, the majority were women (60.3%), White (70.7%) and the average age was 36.63 years old (*SD*=12.96). The sample size was based on power analyses computed using gPower with an $\alpha=0.05$, power of 0.80, and $r=0.20$ based on correlations by Raimi and Leary (2014). This power analysis yielded an approximate sample of 193 necessary to obtain significance given the discussed parameters. Political affiliation was measured using one item, *although it is difficult to summarize one's political, economic, social, and religious views in a single word or phrase, please indicate your overall political viewpoint on the scale below*. Participants responded on a 1 (*very liberal*) to 9 (*very conservative*) scale ($M=4.57$, $SD=2.30$). This item correlated at the zero-order level with many of the predictor variables but did not predict, nor interact with SV in significantly predicting, and did not alter the significance of SV predicting (when it was treated as a covariate) any of the resistance strategies. We also recoded political beliefs as an extremity score (calculated as distance from the midpoint of the scale; 1s and 9s=4, 2s and 7s=3, 3s and 8s=2, 4s and 6s=1, 5s=0). This also did not significantly interact with SV in predicting participants' likelihood to use each of the resistance strategies identified by Jacks and Cameron (2003). Because the effect of political viewpoint predicting participants' perceptions of climate change is well documented and is not the focus of the current article, these effects will not be discussed further, but these effects are available upon request from the corresponding author and the zero-order correlations are presented in Table 1.

2.1.2. Measures

For each of the following measures a composite score was calculated. We first reverse-scored antithetical items and then averaged across the items such that higher scores on each measure represented higher levels of the construct being measured.

2.1.2.1. Social Vigilantism Scale

We used the 14-item Social Vigilantism Scale (SVS; Saucier & Webster, 2010) to measure the extent to which individuals believe their opinion is superior to others and seek to impose those beliefs onto others. This scale is comprised of 14 items (e.g. *I feel as if it is my duty to enlighten other people*) to which participants responded using 1 (*not at all*) to 9 (*very much*) Likert-type scales.

2.1.2.2. Climate change skepticism

In order to assess participants' attitudes toward climate change, we used a scale developed by Whitmarsh (2011) and extended by Corner, Whitmarsh, and Xenias (2012). Participants rated their agreement to 17 items expressing skepticism (e.g., *Climate change is too complex and uncertain for scientists to make useful forecasts*) of the idea that climate change is real, is happening, and is caused by human activity using 1 (*disagree very strongly*) to 9 (*agree very strongly*) Likert-type scales. We also recoded this scale such that responses of 5 were recoded as 0, responses of 4 and 6 were recoded as 1, responses of 3 and 7 were recoded as 2, responses of 2 and 8 were recoded as 3, and responses of 1 and 9 were recoded as 4 to measure skepticism extremity (see Erber, Hodges, & Wilson, 1995; Saucier et al., 2014). We then calculated composite scores by averaging these newly recoded values such that higher scores indicated greater extremity on the measure of skepticism.

2.1.2.3. Attitude strength

To measure participants' strength of their attitudes toward climate change, we used Krosnick et al. (1993) attitude strength dimensions measures. We employed the use of 7 distinct dimensions of attitude strength including certainty, importance, knowledge, intensity, interest, accessibility (talking), and accessibility (thinking). The number of items per dimension ranged from four to seven items, and participants responded to each item using 1 (*not at all*) to 9 (*very much*) Likert-type scales.

2.1.2.4. Resistance strategies

Participants completed 16 items to assess their use of eight resistance strategies in response to attitude challenges (attitude bolstering, assertions of confidence, countering, social validation, selective

Table 1
Means, standard deviations, and bivariate correlations between SV and each of the attitude variables used in Study 1.

| Variable | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|----|
| 1. SV | 5.33 | 1.39 | (0.87) | | | | | | | | | | | |
| 2. Skepticism | 3.73 | 2.09 | -0.02 | (0.97) | | | | | | | | | | |
| 3. Skepticism extremity | 2.51 | 1.14 | 0.16 | -0.46 | - | | | | | | | | | |
| 4. Certainty | 7.15 | 1.65 | 0.20 | -0.40 | 0.63 | (0.92) | | | | | | | | |
| 5. Importance | 6.33 | 2.17 | 0.24 | -0.61 | 0.41 | 0.57 | (0.96) | | | | | | | |
| 6. Knowledge | 5.57 | 1.95 | 0.31 | -0.11 | 0.39 | 0.53 | 0.45 | (0.93) | | | | | | |
| 7. Intensity | 5.93 | 2.10 | 0.27 | -0.51 | 0.44 | 0.66 | 0.87 | 0.61 | (0.94) | | | | | |
| 8. Interest | 6.35 | 1.99 | 0.28 | -0.44 | 0.46 | 0.58 | 0.77 | 0.70 | 0.81 | (0.93) | | | | |
| 9. Accessibility (talking) | 4.51 | 2.11 | 0.36 | -0.23 | 0.35 | 0.32 | 0.55 | 0.65 | 0.60 | 0.65 | (0.95) | | | |
| 10. Accessibility (thinking) | 4.93 | 2.25 | 0.29 | -0.40 | 0.38 | 0.43 | 0.70 | 0.56 | 0.77 | 0.76 | 0.77 | (0.94) | | |
| 11. Belief superiority | 5.71 | 2.03 | 0.34 | -0.32 | 0.43 | 0.55 | 0.54 | 0.55 | 0.66 | 0.57 | 0.51 | 0.59 | (0.95) | |
| 12. Political viewpoint | 4.57 | 2.30 | -0.05 | 0.57 | -0.28 | -0.24 | -0.30 | -0.08 | -0.30 | -0.21 | -0.16 | -0.24 | -0.29 | - |

Note. Correlation coefficients ≥ 0.16 are significant at the $p < .05$ level. Correlation coefficients ≥ 0.23 are significant at the $p < .001$ level. Cronbach alpha levels are presented along the diagonal. For the political viewpoint measure, higher scores indicate higher levels of conservative viewpoints.

exposure, negative affect, source derogation, impression of beliefs; Jacks & Cameron, 2003; Saucier et al., 2014). Participants responded to each of these items using 1 (*not at all*) to 9 (*very much*) Likert-type scales.

2.1.2.5. *Belief superiority*

We examined participants' levels of belief superiority in their attitudes toward climate change using the measure used in previous literature (Raimi & Leary, 2014). Participants used a 1 (*no more correct than other viewpoints*) to 9 (*totally correct, mine is the only correct view*) Likert-type scale to compare the correctness of their beliefs on climate change to others' opinions on it. This measure included four items (e.g., *in your view, how much more correct are your beliefs about climate change than other beliefs about this issue?*).

2.1.3. *Procedure*

After participants completed an informed consent form, participants completed a series of measures beginning with the SV Scale. Participants then completed the measures of perceptions of climate change, the attitude strength dimensions, resistance strategies, belief superiority, and the Climate Change Skepticism Scale. Lastly, participants completed a set of demographic items, were debriefed, and thanked for their participation.

2.2. *Study 1 results*

We began by calculating Mahalanobis distance to check for multivariate outliers. Specifically, SV, skepticism, certainty, importance, knowledge, intensity, interest, accessibility [talking], accessibility [thinking], and belief superiority were entered into a regression with Mahalanobis distance saved. This was then compared to a *chi-square* distribution with 10 predictors. Four participants were flagged as

multivariate outliers. We retained these participants because they comprised a very small proportion of our data.

As can be seen in Table 1, SV was not significantly correlated with participants' skepticism toward climate change. However, SV was significantly positively correlated with the extremity of these skeptical attitudes. In further support of this hypothesis, SV was significantly positively associated with all of the attitude strength dimensions identified by Krosnick and colleagues as well as the extent to which participants perceived their opinions on climate change are superior to others.

We also examined whether SV uniquely predicted participants' perceptions of how likely they would be to use various resistance strategies (Jacks & Cameron, 2003; Saucier et al., 2014) to resist attitude challenges from others. Specifically, in a series of hierarchical regressions, skepticism, certainty, importance, knowledge, intensity, interest, accessibility (talking) and accessibility (thinking), and belief superiority were entered in the first step as control variables, while SV was entered in the second step to examine its unique prediction of each of the resistance strategies (attitude bolstering, negative affect, counterarguing, social validation, source derogation, selective exposure, assertions of confidence, and impression of beliefs). As shown in Table 2, and consistent with our hypotheses, SV was significantly positively uniquely predictive of several of the resistance strategies: negative affect, counterarguing, social validation, source derogation, selective exposure, and impression of beliefs. SV was also positively related to, but not significantly uniquely predictive of attitude bolstering and assertions of confidence. Interestingly, each of the significant resistance strategies are more associated with negative affect (as an emotional response) and directly challenging the opposing viewpoint, while attitude bolstering and assertions of confidence are more predictive of positive affect participants are experiencing (see O'Dea et al., submitted). Future research should further examine the relation-

Table 2
Hierarchical regressions predicting resistance strategies in Study 1.

| DV | | Step 1 | Skepticism | Certainty | Importance | Knowledge | Intensity | Interest | Accessibility (talking) | Accessibility (thinking) | Belief superiority | Step 2 | SV |
|--------------------------|--------------|---------|------------|-----------|------------|-----------|-----------|----------|-------------------------|--------------------------|--------------------|---------|---------|
| Attitude bolstering | ΔR^2 | 0.43*** | | | | | | | | | | 0.01 | |
| | <i>B</i> | | -0.04 | 0.39*** | 0.05 | -0.07 | -0.31* | 0.40*** | 0.21* | -0.05 | 0.23** | | 0.12 |
| | β | | -0.05 | 0.32*** | 0.05 | -0.07 | -0.33 | 0.39*** | 0.22* | -0.05 | 0.23** | | 0.08 |
| Negative affect | ΔR^2 | 0.18*** | | | | | | | | | | 0.03** | |
| | <i>B</i> | | 0.13 | -0.07 | -0.01 | -0.13 | 0.26 | -0.28* | 0.15 | 0.25* | 0.14 | | 0.26** |
| | β | | 0.14 | -0.06 | -0.01 | -0.13 | 0.28 | -0.28* | 0.16 | 0.28* | 0.14 | | 0.18** |
| Counterarguing | ΔR^2 | 0.31*** | | | | | | | | | | 0.03** | |
| | <i>B</i> | | -0.13 | 0.18 | -0.21 | -0.07 | 0.04 | 0.02 | 0.34** | -0.07 | 0.46*** | | 0.31** |
| | β | | -0.11 | 0.13 | -0.19 | -0.05 | 0.03 | 0.02 | 0.30** | -0.06 | 0.39*** | | 0.18** |
| Social validation | ΔR^2 | 0.32*** | | | | | | | | | | 0.01 | |
| | <i>B</i> | | 0.18** | 0.12 | 0.08 | -0.09 | 0.20 | -0.19 | 0.42*** | 0.16 | -0.02 | | 0.13 |
| | β | | 0.18** | 0.09 | 0.08 | -0.08 | 0.20 | -0.18 | 0.41*** | 0.17 | -0.02 | | 0.09 |
| Source derogation | ΔR^2 | 0.19*** | | | | | | | | | | 0.05*** | |
| | <i>B</i> | | 0.28*** | -0.21* | 0.01 | -0.22* | 0.26 | -0.10 | 0.28** | 0.06 | 0.14 | | 0.34*** |
| | β | | 0.30*** | -0.17* | 0.01 | -0.22* | 0.27 | -0.10 | 0.30** | 0.07 | 0.15 | | 0.24*** |
| Selective exposure | ΔR^2 | 0.15*** | | | | | | | | | | 0.05*** | |
| | <i>B</i> | | 0.28** | 0.07 | 0.04 | -0.34** | 0.08 | -0.20 | 0.19 | 0.27* | 0.16 | | 0.37*** |
| | β | | 0.27** | 0.05 | 0.04 | -0.31** | 0.08 | -0.19 | 0.19 | 0.28* | 0.15 | | 0.24*** |
| Assertions of confidence | ΔR^2 | 0.29*** | | | | | | | | | | 0.01 | |
| | <i>B</i> | | 0.17* | 0.41** | -0.09 | -0.41** | 0.12 | 0.04 | 0.20 | 0.34** | 0.17 | | 0.16 |
| | β | | 0.15* | 0.28** | -0.08 | -0.32** | 0.10 | 0.03 | 0.17 | 0.31** | 0.14 | | 0.09 |
| Impressions of beliefs | ΔR^2 | 0.37*** | | | | | | | | | | 0.02** | |
| | <i>B</i> | | -0.09 | 0.07 | 0.05 | 0.22* | -0.04 | 0.09 | 0.15 | -0.10 | 0.32*** | | 0.24** |
| | β | | -0.09 | 0.05 | 0.05 | 0.20* | -0.04 | 0.08 | 0.15 | -0.11 | 0.31*** | | 0.16** |

Note.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

ships between participants' resistance to persuasion as a function of their emotional engagement in the debate.

Taken together, these results provide substantial support for our hypotheses and replicate previous work by Saucier et al. (2014) as well as Raimi and Leary (2014). We showed SV was not correlated with the direction of participants' attitudes toward climate change, but was significantly correlated with each of the measures of attitude strength, extremity, and superiority. Further, we found SV uniquely predicted greater endorsement of many of the resistance strategies in response to participants' attitudes toward climate change. Extending these findings, in Study 2 we examined whether SV impacts perceptions of other individuals involved in interpersonal discussions about climate change.

3. Study 2 overview

In Study 2, we extended the results of Study 1 by examining whether SV predicted participants' perceptions of other individuals in interpersonal discussions of climate change. Little research has examined whether SV influences interpersonal perceptions of individuals engaged in debates. However, as noted in the introduction, these debates are often contentious and involve matters of high investment including, but not limited to, debates about morality, political topics, and religious agendas (Borick & Rabe, 2010; Hart & Nisbet, 2012; Weber & Stern, 2011). Previous research and our findings from Study 1 suggest that individuals higher in SV hold more extreme viewpoints and also experienced more polarized emotions when their attitudes are challenged (e.g., O'Dea et al., submitted). Further, people often operate under premises of false polarization, perceiving the opponent as more extreme in his/her viewpoint (Wilson, 2018). As such, people higher in SV may experience heightened negativity toward their opponent(s). Extending this research, in a 2 (agreement: agree versus disagree) \times 2 (type of response: evidence-referencing versus opposition derogating) between-groups experimental design, we presented participants with a vignette in which another individual agreed versus disagreed with the participants' attitude toward climate change, and did so in an evidence-referencing (e.g., noting there is research on why their opinion is correct) versus opposition derogating (e.g., derogating other opinions without discussing the reasons they have that belief) manner.

We hypothesized SV would interact with both agreement and type of response such that SV would be associated with enhanced positive perceptions (e.g., warmth, competence, agentic, communal) of someone who agreed with the participants especially when the other individual agreed in an opposition derogating manner due to SV being associated with attitude strength and superiority (Saucier & Webster, 2010). Additionally, we predicted SV would be associated with enhanced negative (i.e., lower warmth, competence, agentic, and communal) perceptions of an individual who disagreed with the participant, especially when the other individual disagreed in an opposition derogating manner due to SV being associated with increased resistance to persuasion from others.

3.1. Methods

3.1.1. Participants

A second sample of 325 United States-based participants accessed our survey via Amazon's Mechanical Turk software. According to the MTurk completion information, participation in the current study took on average 9 min, 7 s. Participants who did not spend at least 2 s answering each item (69; Curran, 2016) and who did not complete the entire survey (16) were removed from data analysis. Sample size

was based on recent convention suggesting a sample size of at least 50 participants per cell in our study (Simmons, Nelson, & Simonsohn, 2013; Wilson VanVoorhis & Morgan, 2007). The majority of our participants were female (62.5%), White (72.1%), and the average age was 36.43 years old ($SD=12.73$). Again, political orientation was measured using a single item in which participants reported their perceptions from 1 (*very liberal*) to 9 (*very conservative*) ($M=4.41$, $SD=2.36$), but did not interact with SV in any of the analyses and will not be discussed further because this was not the focus of the current study; the zero-order correlations are presented in Table 1.

3.1.2. Vignette

We randomly assigned participants to read one of four vignettes. In all conditions participants were instructed to, *imagine that someone overheard your opinions on climate change and said...* Participants then read a randomly assigned statement in which the other person agreed with the participant in an evidence-referencing way (i.e., "*You believe that? I agree with you completely! There is enough research and evidence that it would be hard for anybody to try to defeat our argument!*"), agreed with the participant in an opposition derogating way (i.e., "*You believe that? I agree with you completely! Only an idiot would try to defeat our argument!*"), disagreed with the participant in an evidence-referencing way (i.e., "*You believe that? I disagree with you completely! There is enough research and evidence that it would be hard for anybody to try to defeat my argument!*"), or disagreed with the participant in an opposition derogating way ("*You believe that? I disagree with you completely! Only an idiot would try to defeat my argument!*"). We did not pretest participants' beliefs about climate change and categorize them into acknowledging versus not acknowledging the existence of climate change. Therefore, in order to manipulate both agreement and evidence-referencing versus opposition derogating, we could not actually provide evidence in the individuals' response that matched or was in opposition to the participants' beliefs. Instead, we chose to refer to evidence without citing specific findings, which we believe was the optimal wording of the statement.

3.1.3. Measures

Participants completed the same measures of SV, climate change skepticism (prior to the reading the vignettes), and resistance strategy use (after reading the vignettes). In addition to the measures used in Study 1, participants also completed the measures in the following sections. Means, standard deviations, Cronbach's alpha levels, and bivariate correlations among the variables are presented in Table 3.

3.1.3.1. Measures of warmth and competence

We examined participants' perceptions of an individual who agreed or disagreed with their own opinions as warm and competent. Warmth measures how friendly and kind the participants perceive the other individual to be, while competence measures how intelligent and skillful the participant perceives the other individual to be. We presented participants with two items on bipolar scales asking them to rate the individual in the vignette from 1 (*cold*) to 9 (*warm*) and from 1 (*incompetent*) to 9 (*competent*).

3.1.3.2. Bem Sex Role Inventory

We used the short form of the Bem Sex Role Inventory (BSRI; Choi, Fuqua, & Newman, 2009) to examine communal (i.e., caring, sensitive) and agentic (i.e., intelligence, assertiveness) perceptions of the individual in the previous scenario. Participants rated the individual in the vignette on 20 items using 1 (*disagree very strongly*) to 9

Table 3
Means, standard deviations, and bivariate correlations between SV, attitudes toward the person in the vignette, and resistance strategies.

| Variable | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|------------------------------|----------|-----------|--------|--------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|
| 1. SV | 5.61 | 1.21 | (0.84) | | | | | | | | | | | | | | | |
| 2. Climate change attitudes | 3.51 | 2.09 | -0.06 | (0.97) | | | | | | | | | | | | | | |
| 3. Climate change extremity | 2.55 | 1.15 | 0.18 | -0.60 | - | | | | | | | | | | | | | |
| 4. Warmth | 4.63 | 2.48 | 0.29 | -0.08 | 0.16 | - | | | | | | | | | | | | |
| 5. Competence | 4.86 | 2.44 | 0.24 | -0.06 | 0.09 | 0.75 | - | | | | | | | | | | | |
| 6. Communal | 3.68 | 2.11 | 0.28 | -0.01 | 0.06 | 0.77 | 0.70 | (0.98) | | | | | | | | | | |
| 7. Agentic | 6.44 | 1.38 | 0.07 | -0.13 | 0.20 | 0.02 | 0.11 | -0.01 | (0.88) | | | | | | | | | |
| 8. Attitude bolstering | 6.88 | 1.64 | 0.28 | -0.25 | 0.41 | 0.11 | 0.13 | 0.01 | 0.30 | (0.60) | | | | | | | | |
| 9. Negative affect | 3.38 | 1.88 | 0.18 | 0.14 | -0.15 | 0.05 | 0.01 | 0.12 | -0.07 | -0.08 | (0.75) | | | | | | | |
| 10. Counterarguing | 5.36 | 2.05 | 0.40 | -0.15 | 0.24 | 0.09 | 0.10 | 0.10 | 0.18 | 0.45 | 0.32 | (0.71) | | | | | | |
| 11. Social validation | 4.31 | 1.97 | 0.37 | 0.21 | -0.09 | 0.18 | 0.08 | 0.20 | 0.03 | 0.12 | 0.29 | 0.23 | (0.35) | | | | | |
| 12. Source derogation | 3.19 | 2.17 | 0.19 | 0.18 | -0.19 | 0.08 | <0.01 | 0.22 | -0.14 | -0.20 | 0.60 | 0.24 | 0.35 | (0.85) | | | | |
| 13. Selective exposure | 3.93 | 2.07 | 0.08 | 0.27 | -0.18 | 0.07 | -0.05 | 0.15 | -0.05 | -0.17 | 0.39 | 0.18 | 0.37 | 0.51 | (0.62) | | | |
| 14. Assertions of confidence | 5.15 | 2.15 | 0.18 | -0.02 | 0.15 | 0.03 | 0.01 | 0.12 | 0.13 | 0.12 | 0.29 | 0.34 | 0.40 | 0.37 | 0.45 | (0.71) | | |
| 15. Impression of beliefs | 5.68 | 2.02 | 0.48 | -0.18 | 0.19 | 0.22 | 0.22 | 0.19 | 0.11 | 0.44 | 0.13 | 0.59 | 0.20 | 0.12 | -0.02 | 0.19 | (0.60) | |
| 16. Political viewpoint | 4.41 | 2.36 | -0.07 | 0.60 | -0.34 | -0.06 | -0.06 | 0.02 | -0.08 | -0.06 | 0.10 | -0.05 | 0.20 | 0.14 | 0.21 | 0.06 | -0.04 | - |

Note. Alpha levels are presented in parentheses on the diagonal. *r* values ≥ 0.13 are significant at $p < .05$; *r* values ≥ 0.22 are significant at $p < .001$. For the political viewpoint measure, higher scores indicate higher levels of conservative viewpoints.

(agree very strongly) scales regarding the extent to which they perceived the items to apply to the individual. Ten of the items measured communal traits (e.g., *soothes hurts feelings*), and 10 of the items measured agentic traits (e.g., *willing to take risks*). We calculated composite scores by averaging the participants' responses such that higher scores indicated greater perceptions that the individual in the vignette was communal or agentic, respectively.

3.1.4. Procedure

Participants began by completing an informed consent form. They then completed the SV and climate change skepticism measures. Participants then read one of four randomly assigned vignettes and reported their perceptions of the individual in the vignette on the warmth and competence items, as well as on the BSRI in regard to the individual in the vignette. Participants then reported their likelihood of engaging in each of the resistance strategies in response to the statement made by the individual in the vignette. Finally, participants completed demographic items and were debriefed.

3.2. Study 2 results

We used Mahalanobis distance to check for multivariate outliers. SV and participants' attitudes toward climate change were entered into a regression with Mahalanobis distance saved. This was then compared to a *chi*-square distribution with two predictors. This analysis did not yield any multivariate outliers in the data. We then tested whether the results of Study 1 generally replicated in Study 2 by examining the relationships between SV, climate change attitudes, the extremity of climate change attitudes, and reported use of resistance strategies to respond to the statement made by the individual in the vignette. The extremity of participants' climate change attitudes was again calculated by recoding participants' responses to the climate change skepticism measure as the average distance from the midpoint of the response scale. To extend the results of Study 1, we also examined the relationships between SV and perceptions of the other individual in the vignette (as warm, competent, communal, and agentic). As shown in Table 3, consistent with Study 1, SV was uncorrelated with participants' attitudes toward climate change, but was significantly positively correlated with the extremity of participants' attitudes toward climate change and all but one of the strategies used to resist persuasion.

We then examined the independent and combined effects of SV and our manipulated variables of agreement and type of response pre-

dicting participants' perceptions of the individual in the vignette as warm, competent, communal, and agentic controlling for participants' perceptions about climate change. We controlled for participants' attitudes toward climate change by entering participants' scores on the skepticism measure in Step 1. SV was entered in Step 2, followed by our manipulations of agreement and type of response in Step 3. Each of the 2-way interactions was entered in Step 4, and the 3-way interaction was entered in Step 5 to test whether SV interacted with both agreement and type of response. Results are presented in Tables 4 through 7. As the tables show, controlling for participants' perceptions of climate change, SV significantly positively correlated with participants' perceptions of the individual in the vignette as warm, competent, and communal. The main effect of SV predicting participants' perceptions of the other individual as agentic was not significant. However, this is not to say that SV did not have an impact on individuals' perceptions of the other individual as agentic. Instead, this effect was qualified by a significant interaction which will be discussed below. Further, whether the individual in the vignette agreed or disagreed with the participant was shown to significantly impact these perceptions, such that an individual who agreed was perceived as significantly more warm, competent, and communal than someone

Table 4
Hierarchical regression analysis predicting participants' perceptions of warmth in other person.

| Step and predictor variable | <i>B</i> | SE | β | <i>R</i> ² | ΔR^2 |
|--|----------|------|----------|-----------------------|--------------|
| Step 1 | | | | 0.01 | |
| Climate change attitudes | -0.10 | 0.08 | -0.08 | | |
| Step 2 | | | | 0.09*** | 0.08*** |
| SV | 0.71 | 0.15 | 0.29*** | | |
| Step 3 | | | | 0.33*** | 0.24*** |
| Agreement (0=agree; 1=disagree) | -1.97 | 0.27 | -0.40*** | | |
| Type of response (0=evidence-referencing; 1=opposition derogating) | -1.50 | 0.27 | -0.30*** | | |
| Step 4 | | | | 0.33*** | 0.01 |
| SV * agreement | -0.12 | 0.28 | -0.03 | | |
| SV * type of response | 0.18 | 0.28 | 0.05 | | |
| Agreement * type of response | 0.67 | 0.54 | 0.12 | | |
| Step 5 | | | | 0.34*** | <0.01 |
| SV * agreement * type of response | -0.49 | 0.56 | -0.09 | | |

Note. SV was standardized prior to entry in the regressions.

*** $p < .001$.

Table 5

Hierarchical regression analysis predicting participants' perceptions of competence in other person.

| Step and predictor variable | B | SE | β | R ² | ΔR ² |
|--|-------|------|----------|----------------|-----------------|
| Step 1 | | | | <0.01 | |
| Climate change attitudes | -0.07 | 0.08 | -0.06 | | |
| Step 2 | | | | 0.06*** | 0.06*** |
| SV | 0.57 | 0.15 | 0.23*** | | |
| Step 3 | | | | 0.33*** | 0.27*** |
| Agreement (0=agree; 1=disagree) | -2.41 | 0.26 | -0.50*** | | |
| Type of response (0=evidence-referencing; 1=opposition derogating) | -0.98 | 0.26 | -0.20*** | | |
| Step 4 | | | | 0.34*** | 0.01 |
| SV * agreement | -0.08 | 0.27 | -0.02 | | |
| SV * type of response | 0.11 | 0.27 | 0.03 | | |
| Agreement * type of response | 1.11 | 0.53 | 0.20* | | |
| Step 5 | | | | 0.35*** | <0.01 |
| SV * agreement * type of response | -0.45 | 0.55 | -0.08 | | |

Note. SV was standardized prior to entry in the regressions.

* $p < .05$.

*** $p < .001$.

Table 6

Hierarchical regression analysis predicting participants' perceptions of the other person as communal.

| Step and predictor variable | B | SE | β | R ² | ΔR ² |
|--|-------|------|----------|----------------|-----------------|
| Step 1 | | | | <0.01 | |
| Climate change attitudes | -0.01 | 0.07 | -0.01 | | |
| Step 2 | | | | 0.08*** | 0.08*** |
| SV | 0.60 | 0.13 | 0.28*** | | |
| Step 3 | | | | 0.37*** | 0.29*** |
| Agreement (0=agree; 1=disagree) | -2.02 | 0.22 | -0.48*** | | |
| Type of response (0=evidence-referencing; 1=opposition derogating) | -1.14 | 0.22 | -0.27*** | | |
| Step 4 | | | | 0.38*** | 0.01 |
| SV * agreement | 0.05 | 0.23 | 0.02 | | |
| SV * type of response | -0.05 | 0.23 | -0.02 | | |
| Agreement * type of response | 0.70 | 0.45 | 0.15 | | |
| Step 5 | | | | 0.38*** | <0.01 |
| SV * agreement * type of response | -0.34 | 0.46 | -0.07 | | |

Note. SV was standardized prior to entry in the regressions.

*** $p < .001$.

who disagreed. The manner of the response by the individual in the vignette (as evidence-referencing versus opposition derogating) also impacted perceptions of the individual, such that evidence-referencing responses were perceived as significantly more warm, competent, and communal than opposition derogating responses. Neither of our manipulations interacted with SV in the prediction of the individual in the vignette as warm, competent, or communal. Conversely, SV did interact with our agreement variable in predicting perceptions of the individual in the vignette as agentic. Collapsing across type of response, there was a significant positive relationship between SV and perceptions of the individual in the vignette as agentic when the individual in the vignette agreed with the participants ($B=0.30, t=2.41; p=.017$), but not when the individual disagreed with the participants ($B=-0.13, t=-1.01; p=.314$). This finding is consistent with our hypotheses such that higher levels of SV are associated with greater perceptions of individuals as agentic when the other individual agreed with the participant's position.

Taken together, our results did not support our hypotheses about the interaction of SV with our manipulated variables in predicting perceptions of the individual in the vignette, but they do have impor-

Table 7

Hierarchical regression analysis predicting participants' perceptions of the other person as agentic.

| Step and predictor variable | B | SE | β | R ² | ΔR ² |
|--|-------|------|---------|----------------|-----------------|
| Step 1 | | | | 0.02* | |
| Climate change attitudes | -0.09 | 0.04 | -0.13* | | |
| Step 2 | | | | 0.02 | <0.01 |
| SV | 0.09 | 0.09 | 0.06 | | |
| Step 3 | | | | 0.02 | <0.01 |
| Agreement (0=agree; 1=disagree) | 0.05 | 0.18 | 0.02 | | |
| Type of response (0=evidence-referencing; 1=opposition derogating) | 0.10 | 0.18 | 0.04 | | |
| Step 4 | | | | 0.06* | 0.04* |
| SV * agreement | -0.49 | 0.19 | -0.24** | | |
| SV * type of response | -0.18 | 0.19 | -0.10 | | |
| Agreement * type of response | -0.60 | 0.36 | -0.19 | | |
| Step 5 | | | | 0.07 | <0.01 |
| SV * agreement * type of response | 0.30 | 0.10 | 0.10 | | |

Note. SV was standardized prior to entry in the regressions.

* $p < .05$.

** $p < .01$.

tant implications for the interactions between individuals discussing perceptions of climate change. Interestingly, SV did not interact with agreement or type of response in predicting participants' perceptions of the individual in the vignette as warm, competent, or communal. However, SV did uniquely predict perceptions of each of these variables, such that higher scores on SV were associated with greater perceptions of the individual in the vignette as warm, competent, and communal regardless of whether the individual agreed or disagreed with the participants in evidence-referencing or opposition derogating ways. Therefore, individuals higher in SV may not view the opposing individual negatively at his or her core as a person on the basis of this disagreement. Admittedly, more research is needed to fully draw this conclusion, but our results may suggest that, consistent with previous research (O'Dea et al., submitted), SV is associated with resistance strategies (e.g., counterarguing, derogation, anger) in the heat of the moment. However, extending previous research, we found results to suggest the individuals' levels of SV may not impact their overall perceptions of an individual in a discussion or debate about climate change as inherently more warm, competent, or communal as a function of the position, as agreeing or disagreeing, of the individual's statement.

4. Discussion

We investigated whether SV predicted the extremity, strength, and superiority of attitudes toward climate change, resistance to attitude challenges (Study 1), and attitudes toward those who interpersonally challenge (versus agree with) individuals' attitudes toward climate change (Study 2). Consistent with our hypotheses, individuals' levels of SV did not predict the direction of individuals' attitudes toward climate change, but did predict the extremity, strength, and superiority of these attitudes. Additionally, in Study 1, even after controlling for these levels of attitude extremity, strength, and superiority, individuals' levels of SV were positively related to several strategies used to resist persuasion (Jacks & Cameron, 2003; Saucier et al., 2014). Extending these findings, in Study 2, higher levels of SV were again shown to be positively related to the extremity of their attitudes toward climate change and their use of strategies to resist persuasion, but also to greater perceptions of an individual who engaged them in a discussion about climate change as warm, competent, and communal. Further, individuals' levels of SV interacted with our manipulated

variable of agreement in predicting perceptions of the other individual in our vignette as agentic. Specifically, higher levels of SV were associated with significantly higher agentic perceptions of the individual in the vignette when the other individual agreed, but not when the other individual disagreed with the participants. Taken together, these results extend theory and previous research on SV as well as on interpersonal/intergroup discussions of controversial topics in general, and of climate change in particular, by further highlighting the importance of individual differences in the prediction of interpersonal/intergroup attitudes, behaviors, and perceptions.

These studies are not without limitations. Our studies were conducted online using self-report measures and vignettes. Future studies should attempt to replicate these effects using paradigms in which the participants are immersed in actual debates and discussions about their attitudes toward climate change so that their actual, rather than intended, behaviors are observed. Perhaps the largest limitation of the current studies is the possibility the results will not generalize cross-culturally or to other environmental issues. That said, we focused on climate change in particular because in the United States, where the current research was conducted, the acknowledgement/belief in climate change is a polarizing issue with many individuals on each side of the debate (e.g., Bolen et al., 2015; Borick & Rabe, 2010; Hart & Nisbet, 2012; Weber & Stern, 2011). However, in other countries (e.g., many European countries), there is much less debate about climate change because individuals not believing in climate change comprise a very small minority (Lee et al., 2015; Wike, 2016). While climate change was ultimately chosen as the environmental debate topic for the current studies, SV and belief superiority have already been shown to impact polarization on many different environmental topics (Maki & Raimi, 2017; Raimi & Leary, 2014). Therefore, we contend the results of the current studies should generalize to the discussion of other environmental topics and despite these limitations, we believe these results replicate and extend the extant literature. An additional limitation is how we coded climate change skepticism extremity. We based this on previous research (e.g., see Saucier et al., 2014; Erber et al., 1995). However, we acknowledge that it is possible that a 4 on a 9 point scale does not represent the same level of extremity as a 6. That said, we took care to use additional measures of attitude strength from Krosnick et al. (1993) to account for this limitation. From our findings, we can be confident that SV is related to attitude extremity toward climate change. One could also make the argument that our not having tailored the vignette in Study 2 to participants' viewpoints could affect the generalizability of the current findings. That said, we believe that while the vignette was not tailored to the participants' climate change attitudes, the wording of the vignette was broad enough that these statements are applicable to any debate while also maintaining realism.

The current studies also have many important implications for the prediction of attitudes, behaviors, and perceptions of individuals and groups engaged in interpersonal debates about the existence of climate change. Existing literature suggests that as individuals become more knowledgeable about the science behind climate change, their existing beliefs may bias their assimilation of new information, functioning to polarize their attitudes toward climate change (Hart & Nisbet, 2012). As a result, individual differences in motivations to deny (versus accept) the existence of climate change may affect one's interpretation of information about climate change. The current studies go beyond this previous research in a novel and provocative way by highlighting the importance of SV in predicting participants' attitude extremity toward climate change, their resistance to contradictory opinions, and perceptions of those who challenge their beliefs about climate change. Extremely polarized attitudes can create politi-

cal unrest and intergroup anger, possibly leading to antisocial behavior toward those who hold opposing viewpoints (see Saucier et al., 2017). Interestingly, we found SV improved perceptions of individuals who expressed confidence in the credibility of their own opinion regardless of the other individual's position on the topic of climate change. These results, although contrary to our hypotheses, are quite intriguing because they highlight that SV may be related not only to self-directed belief superiority and propagation of beliefs, but also respect for others who have strong beliefs and stand by those beliefs. Admittedly, at this stage, this implication is speculative. This should be further tested experimentally by manipulating whether the opponent demonstrates higher (versus lower) belief superiority and confidence. An additional explanation consistent with previous theory on SV is centered in the desire of individuals to propagate their beliefs. Individuals higher in SV may perceive any opportunity to voice their opinions as a positive encounter, ignoring the "more ignorant" opinions of others, but perceiving others positively due to others providing a vehicle for individuals higher in SV to propagate their beliefs. This possibility can be tested in future research by manipulating whether the individual holding the opposing viewpoint allows the participant to voice his or her opinion on climate change. If individuals higher in SV appreciate any opportunity to voice their opinion and the individual who afforded them the opportunity, they will perceive an individual interrupting this process less positively and perceive an individual allowing for this process more positively. Again, this is speculation based on existing theories associated with SV and belief extremism. Future research should examine these effects further. We intend the current manuscript to be a call for research in the area of attitude extremity to examine why individuals cling to previously held beliefs even in the face of contradictory evidence.

5. Conclusion

While the scientific community has largely verified the existence of climate change, cautioned the world against its consequences, and suggested actions to attenuate these consequences, a debate rages in contemporary American society about whether or not climate change is actually occurring. Our research investigated how individual differences in SV may aid in explaining how individuals perceive their own attitudes toward climate change as superior, possess them extremely, and defend them against challenges, regardless of whether they themselves affirm or deny the existence of climate change. Consistent with our hypotheses, we found higher levels of SV were indeed associated with more extreme attitudes toward climate change, more perceptions of superiority of their beliefs about climate change, and greater reported use of several resistance strategies in response to challenges to their attitudes about climate change. Interestingly, we also found some evidence that higher levels of SV were associated with more positive perceptions of an individual engaged in discussion with the participant about climate change independent of whether the other individual agreed or disagreed with the participant. This finding may provide a foundation for optimism, such that future discussions about climate change, while contentious and sometimes hostile, may actually inspire mutual respect for the individuals positioned on opposite sides of the debate. Thus, the conflict between individuals and groups may ironically inspire reflective positive perceptions, if not agreement. While these final thoughts are speculative, they are more comforting than focusing on the possibility that the controversy about beliefs about climate change is as inevitable and depressing as climate change itself.

Uncited references

References

- Bolsen, T., Druckman, J.N., Cook, F.L., 2015. Citizens', scientists', and policy advisors' beliefs about global warming. *The Annals of the American Academy of Political and Social Science* 658 (1), 271–295. <https://doi.org/10.1177/0002716214558393>.
- Borick, C.P., Rabe, B.G., 2010. A reason to believe: Examining the factors that determine individual views on global warming. *Social Science Quarterly* 91 (3), 777–800. <https://doi.org/10.1111/j.1540-6237.2010.00719.x>.
- Braman, D., Kahan, D.M., Peters, E., Wittlin, M., Slovic, P., 2012. The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change* 2, 732–735.
- Choi, N., Fuqua, D.R., Newman, J.L., 2009. Exploratory and confirmatory studies of the structure of the Bem Sex Role Inventory short form with two divergent samples. *Educational and Psychological Measurement* 69 (4), 696–705. <https://doi.org/10.1177/0013164409332218>.
- Cook, J., Nuccitelli, D., Green, S.A., Richardson, M., Winkler, B., Way, R., ... Skuce, A., 2013. Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letters* 8, 024024.
- Cook, J., Oreskes, N., Doran, P.T., Anderegg, W.R., Verheggen, B., Maibach, E.W., ... Nuccitelli, D., 2016. Consensus on consensus: A synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters* 11 (4), 048002.
- Corbett, J.B., Durfee, J.L., 2004. Testing public (un)certainly of science: Media representations of global warming. *Science Communication* 26 (2), 129–151. <https://doi.org/10.1177/1075547004270234>.
- Corner, A., Whitmarsh, L., Xenias, D., 2012. Uncertainty, skepticism and attitudes towards climate change: Biased assimilation and attitude polarization. *Climatic Change* 114 (3–4), 463–478. <https://doi.org/10.1007/s10584-012-0424-6>.
- Curran, P.G., 2016. Methods for the detection of carelessly invalid responses in survey data. *Journal of Experimental Social Psychology* 66, 4–19.
- Dunlap, R.E., McCright, A.M., Yarosh, J.H., 2016. The political divide on climate change: Partisan polarization widens in the US. *Environment: Science and Policy for Sustainable Development* 58 (5), 4–23.
- Eagly, A.H., Crowley, M., 1986. Gender and helping behavior: A meta-analytic review of the social psychological literature. *Psychological Bulletin* 100 (3), 283–308.
- Erber, M.W., Hodges, S.D., Wilson, T.D., 1995. Attitude strength, attitude stability, and the effects of analyzing reasons. In: Petty, R.E., Krosnick, J.A. (Eds.), *Attitude strength: Antecedents and consequences*. Erlbaum, Mahwah, NJ, pp. 433–454.
- Hart, P.S., Nisbet, E.C., 2012. Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. *Communication Research* 39, 701–723. <https://doi.org/10.1177/0093650211416646>.
- Jacks, J.Z., Cameron, K.A., 2003. Strategies for resisting persuasion. *Basic and Applied Social Psychology* 25, 145–161. https://doi.org/10.1207/S15324834BASP2502_5.
- Krosnick, J.A., Boninger, D.S., Chuang, Y.C., Berent, M.K., Carnot, C.G., 1993. Attitude strength: One construct or many related constructs?. *Journal of Personality and Social Psychology* 65 (6), 1132–1151. <https://doi.org/10.1037/0022-3514.65.6.1132>.
- Lee, T.M., Markowitz, E.M., Howe, P.D., Ko, C.Y., Leiserowitz, A.A., 2015. Predictors of public climate change awareness and risk perception around the world. *Nature Climate Change* 5 (11), 1014–1020.
- van der Linden, S.L., Leiserowitz, A.A., Maibach, E.W., 2018. Scientific agreement can neutralize politicization of facts. *Nature Human Behaviour* 2 (1), 2–3.
- Maki, A., Raimi, K.T., 2017. Environmental peer persuasion: How moral exporting and belief superiority relate to efforts to influence others. *Journal of Environmental Psychology* 49, 18–29.
- Melillo, J.M., Richmond, T.T., Yohe, G., 2014. Climate change impacts in the United States. *Third national climate assessment*.
- O'Dea, C.J., Zhu, Q., Saucier, D.A., 2018. Engaged and upset: Social vigilantism, positive and negative affect, and resistance to attitude challenges. (manuscript in preparation).
- Raimi, K.T., Leary, M.R., 2014. Belief superiority in the environmental domain: Attitude extremity and reactions to fracking. *Journal of Environmental Psychology* 40, 76–85. <https://doi.org/10.1016/j.jenvp.2014.05.005>.
- Sarge, M.A., VanDyke, M.S., King, A.J., White, S.R., 2015. Selective perceptions of hydraulic fracturing: The role of issue support in the evaluation of visual frames. *Politics and the Life Sciences* 34 (1), 57–72. <https://doi.org/10.1017/pls.2015.6>.
- Saucier, D.A., Webster, R.J., 2010. Social vigilantism: Measuring individual differences in belief superiority and resistance to persuasion. *Personality and Social Psychology Bulletin* 36 (1), 19–32. <https://doi.org/10.1177/0146167209346170>.
- Saucier, D.A., Webster, R.J., Hoffman, B.H., Strain, M.L., 2014. Social vigilantism and reported use of strategies to resist persuasion. *Personality and Individual Differences* 70, 120–125. <https://doi.org/10.1016/j.paid.2014.06.031>.
- Saucier, D.A., Webster, R.J., O'Dea, C.J., Miller, S.S., 2017. The role of individual differences in inciting anger and social action. In: Cloninger, S.C., Leibo, S.A. (Eds.), *Understanding angry groups: Multi-disciplinary perspectives on their motivations and effects on society*. Praeger.
- Simmons, J.P., Nelson, L.D., Simonsohn, U., 2013. Life after P-Hacking. In: Meeting of the Society for Personality and Social Psychology, New Orleans, LA, 17–19 January 2013, (Available at SSRN: <https://ssrn.com/abstract=2205186> or doi: <https://doi.org/10.2139/ssrn.2205186>).
- Watson, D., Clark, L.A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology* 54 (6), 1063–1070.
- Weber, E.U., Stern, P.C., 2011. Public understanding of climate change in the United States. *American Psychologist* 66 (4), 315–328. <https://doi.org/10.1037/a0023253>.
- Whitmarsh, L., 2011. Skepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change* 21 (2), 690–700. <https://doi.org/10.1016/j.gloenvcha.2011.01.016>.
- Wike, R., 2016. What the world thinks about climate change in 7 charts. Pew Research Center, Retrieved from <http://www.pewresearch.org/fact-tank/2016/04/18/what-the-world-thinks-about-climate-change-in-7-charts/>.
- Wilson, A., 2018. The ties that blind: How diverging definitions and false polarization increases division and obscures common ground. Paper presented at the annual Group Processes and Intergroup Relations Preconference in Atlanta, GA.
- Wilson VanVoorhis, C.R., Morgan, B.L., 2007. Understanding power and rules of thumb for determining sample sizes. *Tutorials in Quantitative Methods for Psychology* 3 (2), 43–50.