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Social Psychological Perspectives on Political Polarization: Insights and Implications for Climate Change

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Abstract

Political polarization is a barrier to enacting policy solutions to global issues. Social psychology has a rich history of studying polarization, and there is an important opportunity to define and refine its contributions to the present political realities. We do so in the context of one of the most pressing modern issues: climate change. We synthesize the literature on political polarization and its applications to climate change, and we propose lines of further research and intervention design. We focus on polarization in the United States, examining other countries when literature was available. The polarization literature emphasizes two types of mechanisms of political polarization: (1) individual-level psychological processes related to political ideology and (2) group-level psychological processes related to partisan identification. Interventions that address group-level processes can be more effective than those that address individual-level processes. Accordingly, we emphasize the promise of interventions leveraging superordinate identities, correcting misperceived norms, and having trusted leaders communicate about climate change. Behavioral interventions like these that are grounded in scientific research are one of our most promising tools to achieve the behavioral wedge that we need to address climate change and to make progress on other policy issues.

Keywords

political polarization, climate change, interventions, social norms, social identities, affective polarization

Widespread political polarization impedes progress on many issues (Alló & Loureiro, 2014; APA Climate Change Task Force, 2022; Bernauer, 2013; Funk et al., 2019; Jost et al., 2022; Kachi et al., 2015; McCright & Dunlap, 2011; Stehr, 2015; van der Linden, 2016; van der Linden et al., 2015), including climate change (Pew Research Center, 2020), gun control (Van Boven et al., 2019), and the COVID-19 pandemic (Calvillo et al., 2020; Cole, Flores, et al., 2022; Flores et al., 2022). Social psychology has a rich history of studying political polarization, and this body of research can be leveraged to understand and improve responses to such issues.

Among modern policy issues, climate change is one of the most pressing and most polarized (APA Climate Change Task Force, 2022; Pew Research Center, 2020), especially in the United States (Tesler, 2018). Whereas researchers and the general public alike have previously considered skepticism about the existence of climate change to be the primary barrier to effective climate action, at present most people across ideologies, political parties, and countries accept the threat of climate change (Cole, Ehret, et al., 2022; Fagan & Huang, 2019; Van Boven et al., 2018). Thus, other psychological barriers are at play (Allcott & Mullainathan, 2010), and polarization is one of the most important (Van Boven et al., 2018). Political ideology and partisan identification strongly predict and influence climate change stances, especially in the United States (Egan & Mullin, 2017; Tesler, 2018), but also across the globe (Hornsey et al., 2016). In this article, we review the state of the social psychology literature on political polarization and

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discuss how it applies to climate change. For our purposes, we define polarization as opposing stances on political issues between political parties. We also propose lines of future research to further the scientific understanding of polarization and develop strategies to address climate change polarization.

Climate change polarization in the general public is important because it impedes public action and because it perpetuates polarization among political elites, which can block policy progress (Budge & Hofferbert, 1990; Burstein, 2003; Cole, Ehret, et al., in prep; Constantino et al., 2022; Druckman et al., 2013; Egan & Mullin, 2017; Flores et al., 2022; Hetherington, 2001; Stimson et al., 1995). Through elections, ordinary citizens have valuable opportunities to contribute directly to increases or decreases in future carbon emissions. Citizens can donate to and vote for candidates who will implement programs to significantly reduce carbon footprints (Constantino et al., 2022; Wynes et al., 2021), and they can lobby their politicians to implement climate-friendly policies (Sherman et al., 2021). Dissatisfaction with political leadership can also prompt people to demand greater direct influence in the policy process (Bessen, 2020), thereby influencing whether political elites can successfully implement new policies. This emphasizes the importance of understanding political attitudes of the general public.

In the United States in particular, the constitutional design requires polarization to be bypassed or reduced in order for the adoption of major federal legislation to limit greenhouse gas emissions because the structure of the national government overweights the influence of moderate and conservative voters. For example, the selection of two senators from each state means that roughly 18% of the population controls 50 of the 100 votes, with a simple majority of votes required for action in some circumstances and two thirds of votes required in others. Whereas the Inflation Reduction Act demonstrated that some types of decarbonizing activities can be subsidized by the federal government, the overarching product of these institutional constraints is inaction on major new carbon taxes or other regulatory legislation on greenhouse gas emissions (Gilligan & Vandenbergh, 2020; Vandenbergh, 2013, 2022).

Existing research provides a broad understanding of behavioral science related to climate change and psychological drivers of climate change-related attitudes and behaviors (Allcott & Mullainathan, 2010; Doell et al., 2021; Pearson et al., 2016; Peng et al., 2021; Swim et al., 2011; van der Linden & Weber, 2021). There remains an opportunity to further connect research on political polarization to the context of climate change, and leverage polarization research to design and scale depolarization interventions (Velez & Moros, 2021). This is particularly important given that polarization has increased and become a more prominent barrier to climate action in recent years (Pew Research Center, 2020; Van Boven et al., 2018). Moreover, in addition to using the science of polarization to inform responses to climate change, researchers can use the context of climate change to further the scientific understanding of polarization because climate change is particularly polarized (APA Climate Change Task Force, 2022; Baldassarri & Park, 2020; Pew Research Center, 2020) and is also an important and evocative modern issue.

Defining Polarization

In this article, we primarily examine issue polarization, which is the attitudinal component of polarization and comprises divisions in issue stances between groups (primarily political parties; Fernbach & Van Boven, 2022). We differentiate issue polarization from affective polarization, which is the emotional component of polarization and primarily comprises positive feelings toward one's ingroup and negative feelings toward one's outgroup (Druckman et al., 2021; Finkel et al., 2020; Iyengar et al., 2019; Mason, 2015; Simas et al., 2020). Affective polarization is discussed in a specific subsection in the second half of this article.

Polarization, as we consider it, does not necessarily encompass any group of people holding a particularly extreme stance on an issue. It is possible that two groups of people can hold opposing stances—even drastically opposing stances—without either stance being an outlier on the spectrum of political attitudes in a given context. Our discussion of the theory of polarization centers on how opposing stances emerge, and how they are maintained, regardless of the content and extremity of those stances, with the goal of understanding how to reduce or soften the opposing stances.

We review two key focuses of political psychology: individual-level and group-level processes. *Individual-level processes* of polarization relate to and result from political ideology (Gifford, 2011): differences between liberals and conservatives in beliefs about society and the role of government (Gerring, 1997; Jost et al., 2008, 2009; Joyner & Lane, 1963; Malka & Lelkes, 2010; Roy & Denzau, 2020), and related personality traits, risk perception, and morality. Although research on individual-level processes has historically been the focus of political polarization research (Ditto et al., 2019), recent work indicates that group-level processes may be more influential (Fritsche et al., 2018; Iyengar et al., 2012; Masson & Fritsche, 2021; Pearson et al., 2016). *Group-level processes* are related to and result from identification with a group; in the case of political polarization, this is generally one's political party (Doell et al., 2021).

Our distinction between individual- and group-level processes refers to the direction of influence from which the psychological processes originate. Individual-level processes originate within an individual, from a person's thinking style, whereas group-level processes originate from influences by one's social group.

We adopted this terminology from Pearson et al. (2016), although similar distinctions have been made and called individualistic versus social identity perspectives (Ferguson et al., 2016) or intrapersonal versus interpersonal perspectives (Gifford et al., 2011), which relate to but do not completely map onto the distinction between individual- and group-level processes. We chose the categories and names that are most relevant to political polarization, interventions, and existing literature on those topics. Our definition of group-level processes does not include collective emotions or attitudes (Hoover et al., 2021; Karimi-Malekabadi et al., 2021; Vlasceanu et al., 2018), in which groups of individuals have a shared psychological experience, and it also does not include processes resulting from punishment and rewards, termed external processes by Gifford et al. (2011).

Much of the existing literature on political ideology and individual-level processes focuses on the idea of bias, which results from psychological processes such as selective attention and motivated reasoning that do not accurately weigh information from one's environment and that may result in judgments, attitudes, or beliefs incongruent with fact (Hahn & Harris, 2014). Our review of processes that influence polarization overlaps with the study of bias, but polarization is not the same as bias. It is possible that groups of individuals hold opposing stances on an issue with both views based on fact, logic, and reasoning. Our goal was to understand why and how such opposing stances emerge and persist. Sometimes they result from biased processes, though not always. Within our discussion of individual-level processes, we identify when we discuss bias, and we relate that to how such bias contributes to polarization.

Building on Prior Work About Climate Psychology and Polarization

Complementing other review articles that have focused on either political polarization or climate change, our review is the first that we know of to focus on the intersection of the two. Our work supplements other recent insightful review articles (see Constantino et al., 2022; Ferguson et al., 2016; Gifford et al., 2011; Nielsen et al., 2021; van der Linden & Weber, 2021). Some of these review articles provide useful *context-focused* examinations, with the emphasis on the context of climate change guiding the review (e.g., van der Linden & Weber, 2021). Our review, conversely, is *process focused*, guided by examining the psychology of polarization as it relates to climate change. Constantino et al. (2022) conducted another process-focused review, theirs instead about social norms. Gifford et al. (2011) aggregated a history of theories of environmental behavior up to the beginning of the decade before our review article was written. They briefly discussed polarization (Gifford et al., 2011), but polarization has since risen in significance to be one of the major barriers to climate action (Pew Research Center, 2020). Ferguson et al. (2016) reviewed how individualistic and social identity-based interventions can target climate change attitudes and behaviors, with a focus on self-interest as the key individual-level factor. We turn instead to ideology as the key individual-level factor that is related to polarization, and we expand the examination of group-level processes beyond social identities. These authors discussed interventions that provide information or messaging to motivate pro-climate behavior change and interventions that change structures in which climate change-related attitudes and behaviors are formed and occur (Ferguson et al., 2016). We review and propose an expanded set of intervention approaches. Nielsen et al. (2021) indeed emphasized the need for psychologists to go further in intervention research and design, and we contribute to this.

Jost et al. (2022) conducted a related process-focused review on the psychology of political polarization, exploring in depth different types of polarization, their external causes, and their psychological roots. They provided a domain-general examination of polarization that indicates the importance of examining polarization within specific contexts, as we do with climate change. They wrote (Jost et al., 2022),

> Unfortunately, the empirical literature has not advanced to the point that it is possible to hypothesize with precision how any given attempt at political communication will interact with cognitive–motivational mechanisms in specific social communication contexts to influence polarization or depolarization. (p. 570)

Drawing from the psychological theories that they reviewed and synthesized, we address the question of how and what polarization processes emerge in the context of climate change and how to intervene in those processes.

Our Review

In this review, we describe the existing literature about individual-level processes that drive polarization of

climate change, including ideology, personality traits and cognitive styles, and perceptions of risks, threats, and morality. We summarize research about the group-level processes including social identities, social norms, and affective polarization. We review climate change-focused work that relates to these processes, and we propose methods to develop interventions that draw from these theories. We argue that some of the most promising interventions are those that can bypass solution aversion, leverage superordinate identities, correct misperceived norms, and foreground trusted leaders in climate change communications.

Given the available literature and the prominent political polarization surrounding climate change in the United States (Pew Research Center, 2020), we focus primarily on theories and interventions that have been studied in the United States, and we include relevant work on other countries when available. Additional work is needed to understand how polarization processes may or may not generalize to other cultures, particularly in the Global South and Global East. We encourage our readers to keep in mind the potential for and limitations to generalizability of the work we review and to explore such generalizability themselves.

Reducing or bypassing political polarization is essential to make progress on climate change mitigation at the national and international levels. We urge a continued focus on the challenge of polarization in the fields of social, political, and environmental psychology, as well as adjacent fields, and we make recommendations to this end in the following sections.

Individual-Level Polarization Processes

Differences in thinking styles between individuals relate to political ideology and can exacerbate political polarization. We describe ideological variability related to polarization and review processes related to ideological differences that explain and influence polarization. Table 1 presents the key individual-level processes that drive polarization, their definitions, and suggested lines of future research. Our review of individual-level polarization processes aggregates a field of work that has emerged distinctly from group-level polarization work, and our aim is to summarize and translate this body of work to polarization researchers as well as those who design and implement depolarization interventions.

Ideology

Political ideology encompasses individuals' beliefs about how society should be structured and what the government's role in society should be (Gerring, 1997; Jost et al., 2008, 2009; Joyner & Lane, 1963; Malka & Lelkes, 2010; Roy & Denzau, 2020). Liberal and conservative ideology are characterized by differences in perceptions of government in society (Pierson & Schickler, 2020) as well as distinct worldviews and values (Gerring, 1997; Jost et al., 2008, 2009). Ideology provides individuals with epistemic, relational, and existential frameworks, including a sense of certainty, control, safety, and identity (Gerring, 1997; Jost et al., 2008, 2009, 2017). People adopt and maintain ideologies that fit their personal needs and motivations (Oyserman & Schwarz, 2017).

Ideology relates to and influences responses to climate change (Gifford, 2011). Liberals believe in climate change (Doell et al., 2021; Kahan, 2012; Van Boven et al., 2018), believe climate change is anthropogenic (Druckman & McGrath, 2019), are concerned about climate change (van der Linden, 2017), and support climate change mitigation more than conservatives do (E. Campbell et al., 2021), although the difference, at least in belief in climate change, is shrinking (Van Boven et al., 2018).

Motivated reasoning. Motivated reasoning that relates to one's ideology can exacerbate polarization. Motivated reasoning is defined as the biased processing of information in order to arrive at one's preexisting or desired conclusion (Ecker et al., 2022; Kunda, 1990). Some work shows that conservatives engage more than liberals do in motivated reasoning (Brandt et al., 2014; Jost, 2017; Jost et al., 2003). In particular, conservatives can show motivated reasoning when forming their attitudes about economic inequality in the United States (Bartels, 2019). Other work shows that liberals and conservatives both engage in motivated reasoning (Frimer et al., 2017; Kahan, 2016). Related to and sometimes fueling motivated reasoning, both liberals and conservatives can show motivation for accuracy. Misinformation can drive polarization (Ecker et al., 2022), and leveraging this motivation for accuracy through climate change communication could help address this (Doell et al., 2021), perhaps by emphasizing scientific consensus, a strategy that has been shown to increase belief in anthropogenic climate change and reduce the partisan gap on the issue (Lewandowsky et al., 2013; van der Linden, 2021; van der Linden et al., 2018). Such informational approaches may be useful for individuals who still do not believe in human-caused climate change because the beliefs that hold them back from climate action relate to misperceptions of facts (although, as noted, this group is smaller than many people think; Van Boven et al., 2018).

Solution aversion. Both liberals and conservatives can at times engage in a form of motivated reasoning called *solution aversion*, which is the psychological process of denying that a problem exists because one does not like

Table 1. Individual-Level Psychological Processes That Drive Political Polarization, Their Definitions, and Related Research Directions for Interventions That Depolarize Climate Change

Individual-level psychological process	Definition and examples	Research directions to develop depolarization interventions
Ideology	Liberal or conservative preferences about the structure of society and the role of government in how this structure should be achieved	• *Key strategy*: reducing solution aversion toward climate change among conservatives by emphasizing private sector solutions
Personality traits and cognitive styles	Psychological trait differences in how liberals and conservatives think, such as differing levels of need for cognition, system justification, and trust in government	• Leveraging liberals' and conservatives' common psychological traits, such as motivation for accuracy
Risks and threats	Differences in how liberals and conservatives perceive risks and threats and how they respond to these, such as both liberals and conservatives responding to threats to their worldviews but conservatives responding more to threats to their physical safety	• Framing the threat of climate change in ways that trigger perceptions of risk among both liberals and conservatives (e.g., meaning threats)
Morality	Differences in how liberals and conservatives define morality and what they consider to be moral and immoral, such as conservatives weighting all five dimensions—harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity—when thinking about morality, but liberals placing more weight on the first two	• Leveraging common morals between liberals and conservatives, including harm/care and fairness/reciprocity, and leveraging more conservative morals of ingroup/loyalty, authority/respect, and purity/sanctity

the potential solutions to that problem (T. H. Campbell & Kay, 2014). This process can explain modern science denial by conservatives (T. H. Campbell & Kay, 2014). For example, people who espouse free market ideology (who tend to be conservative) estimate risks of the coronavirus to be low when government solutions to address the pandemic are touted (Chu et al., 2021). Liberals do not accurately perceive rates of gun violence against intruders when the proposed solution is more lax gun control (T. H. Campbell & Kay, 2014).

Individuals of both ideologies can show solution aversion in the climate change domain (T. H. Campbell & Kay, 2014; McCright et al., 2013). Differences in belief in climate change between liberals and conservatives can partly be explained by opposition to governmental solutions to climate change (T. H. Campbell & Kay, 2014; Kahan, 2012). The *anti-reflexivity hypothesis* describes how conservatives are more likely to reject environmental science when they believe that it attributes environmental and public health problems to economic causes, but they are more trusting of science that describes new inventions and innovations that benefit the economy (McCright et al., 2013). Dixon et al. (2017) examined whether messaging designed to appeal to conservatives' morals and values would increase their belief in climate change, and, in fact, emphasizing free market solutions to climate change did. They told their participants that deregulation of markets in Arizona resulted in a surge in wind energy, and this led conservative participants to report that they more strongly agreed that climate change is happening (Dixon et al., 2017). Kahan et al. (2007) found that liberals were more likely to deny facts about climate change when presented with expansion of nuclear power as the solution rather than anti-pollution regulation. Future research should identify a variety of climate change solutions that can appeal to moderates and conservatives (as well as liberals) and explore the most effective ways to communicate about such solutions.

Recent work has begun to explore the potential for more widely appealing solutions. In general, people higher in free market ideology and hierarchicalism—defined as support for social hierarchies—are less likely to support typical climate change solutions (Hornsey, 2021). These traits tend to correlate with political conservatism. Revenue-neutral carbon taxes can be more appealing to conservatives than revenue-generating carbon taxes (Ehret et al., 2018; Van Boven et al., 2018). Gillis et al. (2021) found that learning what companies have done to mitigate climate change increases conservatives' support for both reducing carbon emissions and government action to mitigate climate change.

Framing climate change as a national security threat can increase Republicans' concern about climate change and support for government action (Feldman & Hart, 2018; Fielding et al., 2020; Gainous & Merry, 2022), especially when the issue of energy dependence is emphasized (Gainous & Merry, 2022). Whitmarsh and Corner (2017) found that framing climate change in terms of green jobs and innovation increased pro-environmental intentions among conservatives.

Other research raises doubt on whether ideologically targeted messaging is effective (Aklin & Urpelainen, 2013; Arpan et al., 2018) or may backfire (Myers et al., 2012). National security framings may sometimes decrease concern about climate change and support for government action among liberals (Gainous & Merry, 2022). Bernauer and McGrath (2016) did not find success with framing climate change solutions in terms of technological innovation, green jobs, community building, and health benefits. This framing had no effect on pro-environmental behavioral intentions or environmental citizenship (Bernauer & McGrath, 2016). Buchanan et al. (2022) examined the effects of certain climate change frames in a diverse, international sample. Their messages presented climate change in terms of actual language used by the United Nations at the time of the study, describing social norms, public health, or patriotism. They found small effects of framing; the most effective frame increased the percentage of participants supporting government action by only 1.6% compared with the control condition (Buchanan et al., 2022). Given the range of effects found in these types of studies, further research can contribute to understanding the potential and limitations of such framing-based messaging.

Personality traits and cognitive styles

Liberals and conservatives differ on a range of other psychological constructs, including trait characteristics, perceptions of risks and threats, and morality (Crawford, 2017; Graham et al., 2009; Jost, 2017). Differing personality traits and cognitive styles between liberals and conservatives have been shown in some studies to predict and cause political polarization (Brandt et al., 2014). Conservatives may be more likely than liberals to endorse free market ideology and right-wing authoritarianism (Jost et al., 2003), which is defined as obedience to authority, disapproval of people who disobey authority, and adherence to social conventions. Liberals sometimes show a less-explored tendency called left-wing authoritarianism, which encompasses traits associated with right-wing authoritarianism, such as aggression, submission, and conventionalism, but among individuals who oppose traditional hierarchies of authority that are favored by right-wing authoritarians (Atari, Haidt, et al., 2022; Costello et al., 2022; Stone, 1980). Right-wing authoritarianism and left-wing authoritarianism share some personality and cognitive-style antecedents but correlate with conservative and liberal ideologies, respectively (Costello et al., 2022). Liberals sometimes have greater belief in the stability of society (Jost et al., 2003). Conservatives may more strongly prefer maintaining the present social order (Janoff-Bulman et al., 2008), which is related to *system justification*, a belief that the order of society exists for a reason (Jost et al., 2003). Conservatives also may show more need for closure, dogmatism, and avoidance of uncertainty, whereas liberals show more openness to experience (Joseph et al., 2009; Jost et al., 2003, 2017; Van Hiel et al., 2010). Conservatives across the world can be more likely to endorse conspiracy theories (Imhoff et al., 2022; van der Linden et al., 2021). Liberals may show more need for cognition and propensity for cognitive reflection (Jost, 2017). Conservatives often perceive greater within-group consensus and collective efficacy (Jost et al., 2003, 2017) and desire greater within-group consensus and conformity (Jost et al., 2018). Liberals prefer to think more analytically and less rigidly than conservatives in some contexts (Jost et al., 2003, 2017), and this has been shown both in the United States and in urban areas in China (Talhelm et al., 2015). American liberals sometimes show more empathy and desire to feel empathy than conservatives, although this difference is less pronounced in China and Germany (Hasson et al., 2018; Ziegler, 2017). Liberals in the United States and Germany have shown greater desire to help other people (Hasson et al., 2018), although across countries, conservatives have been found to donate more to charity (Yang & Liu, 2021). Differences between liberals and conservatives in cognitive inflexibility, authoritarianism, nationalism, and system justification explain 48% of the variance in support for Brexit (Zmigrod et al., 2018).

Despite this variety of differences, other work has found similarities between liberals and conservatives in authoritarianism (Frimer et al., 2014), rigidity, and simplemindedness (Conway et al., 2016). Frimer et al. (2014) argued that differences between liberals and conservatives in obedience to authority may have been observed in other studies because the authorities included in the experiments tended to be conservative. Both liberals and conservatives can show obedience to authority when authority figures in question are from their own political party (Frimer et al., 2014). Liberals and conservatives both sometimes avoid exposure to (Frimer et al., 2017) and deny the validity of (Washburn & Skitka, 2018) ideologically differing viewpoints. Both

sides may discount media about ideologically different ideas as "fake news," although to varying extents (van der Linden et al., 2020). Liberals and conservatives also sometimes show a similar need for certainty and openness to information that contradicts their preexisting beliefs (Guay & Johnston, 2022).

Conway et al. (2016) examined differences and similarities in simplemindedness between liberals and conservatives. They defined simplemindedness as an overarching psychological construct encompassing both dogmatism—belief in core principles that are inherently true without questioning—and integrative complexity—the extent to which people describe different dimensions of an issue and integrate these multiple dimensions in their descriptions. The authors argued that both liberals and conservatives show simplemindedness, although in different domains; each group shows more simplemindedness in domains about which they hold weaker attitudes, such as religion for liberals and environmental issues for conservatives. These authors argued that other research concluding that conservatives are more simpleminded has focused on the domains less significant to them.

Future research could examine how to leverage common cognitive styles between liberals and conservatives, such as the motivation for accuracy, to create depolarization interventions for climate change. Research could also examine the conditions under which liberals and conservatives show similar or different cognitive styles and explore the design of climate communications that prompt similar processing styles among people across ideologies.

Risks and threats

Liberals and conservatives show different patterns in how they respond to risks and threats: some context-specific differences and some relating to underlying ideology. Negativity bias—a tendency to be attuned to and strongly react to negative signals in the surrounding world—can lead to conservatism (Altemeyer, 1998; Brandt et al., 2014; Duckitt & Fisher, 2003; Fraley et al., 2012). Some work posits that conservatives' physiological (Crawford, 2017; Oxley et al., 2008) and psychological (Jost et al., 2017) responses to threat are generally stronger than those of liberals. Conservatives have shown stronger fears of loss and death (Jost, 2017). Mortality salience—thinking about or being primed to think about one's mortality—affects attitudes and behaviors of conservatives more than it affects liberals (Jost et al., 2017). Adopting a conservative ideology can be a strategy used by people who are especially sensitive to uncertainty and threat (Jost et al., 2003). Relatedly, exposure to terrorist attacks, governmental warnings, and shifts in racial demography can increase conservatism in the public (Jost, 2017).

In contrast, Brandt et al. (2014) demonstrated similar responses to threat between liberals and conservatives. Jost et al. (2017) also found that liberals and conservatives can show similar fear of death. Crawford (2017) argued that our definitions of threat and ideology determine whether we conclude that there are differences. The *compensatory political behavior model* describes how liberals and conservatives respond with similar magnitude and in similar fashion to "meaning threats"—threats to their worldviews—whereas conservatives respond more strongly than liberals do to "safety threats"—threats to their physical safety and well-being (Crawford, 2017). Meaning threats tend to produce anxiety, whereas physical threats tend to produce fear, and this model implies that liberals and conservatives respond more or less equally to anxiety but that conservatives are more responsive to fear than are liberals. These findings align with the work of Jost et al. (2017) and Oxley et al. (2008). Future work can examine how to communicate about climate change in ways that invoke a sense of risks and threats in both liberals and conservatives, perhaps leveraging the common reactions to meaning threats.

Morality

Conservatives and liberals define and perceive morality differently (Graham et al., 2009, 2011; Haidt & Graham, 2007; Haidt & Joseph, 2004). The original *moral foundations theory* posited that people perceive five dimensions of morality: harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity. The first two are considered "individualizing" foundations, relating more to individuals' rights within society and threats to individuals. The latter three are "binding" foundations, relating more to the functioning of society as a collective. Prior work showed that liberals weigh the individualizing foundations of harm/care and fairness/reciprocity more heavily when evaluating the morality of something, whereas conservatives consider all five dimensions or sometimes might weigh the binding foundations of ingroup/loyalty, authority/respect, and purity/sanctity more heavily (Graham et al., 2009, 2011; Kivikangas et al., 2021). Recent work demonstrated that the dimension of fairness can be more accurately modeled with two components: equality and proportionality. Equality encompasses the belief that all people should receive equal opportunities and treatment, whereas proportionality encompasses the belief that opportunities and treatment should be in balance

with one's inputs, contributions, and situation (Atari, Haidt, et al., 2022).

Scholars have argued both that one's perception of morality leads to ideology and that ideology leads to how morality is perceived (Ciuk, 2018; Smith et al., 2017). Differences in weighting of and definitions of dimensions between individuals of different ideologies lead liberals to sometimes consider conservatives' decisions and political positions to be immoral (Haidt & Graham, 2007). A caveat is that some researchers have found substantial variation in the correspondence between ideology and morality between cultures and between races, indicating that caution must be used when generalizing results of the reviewed research on morality (Kivikangas et al., 2021).

Some work has shown that specific framing-based messaging about climate change is effective when focusing on morals that appeal to conservatives or across the ideological spectrum (Feinberg & Willer, 2019; Wolsko et al., 2016). For example, Sachdeva et al. (2019) demonstrated that purity-based messaging—discussing environmental conservation in terms of avoiding pollution, contamination, toxicity, and degradation—could increase pro-environmental behavior. This is true across the full samples in their studies; thus, any negative effect of more conservative-associated purity-based messaging among liberals did not outweigh the overall positive effect (Sachdeva et al., 2019). Future work could leverage the Moral Foundations Questionnaire–2 (Atari, Haidt, et al., 2022), a revised scale that adds proportionality to the fairness dimension, to examine how the expanded dimensions of morality correspond to and could be used to motivate climate change-related attitudes and behaviors among both liberals and conservatives.

Are liberals and conservatives equally biased?

Researchers have debated whether liberals and conservatives are equally biased or whether one side shows more systematic deviations from objective thinking. Ditto et al. (2019) argued that bias is more or less the same between liberals and conservatives. They conducted a meta-analysis looking at differences between how liberals and conservatives process political information and found no differences by ideology. Baron and Jost (2019) responded to this meta-analysis with the argument that the studies reviewed were not designed to compare levels of "irrational" bias between liberals and conservatives and so the conclusion of Ditto et al. (2019) was unjustified. We argue that given research showing both similarities and differences between liberals and conservatives, there need not be a debate. The research on both sides is compatible; liberals and conservatives are similarly biased in certain contexts and differentially biased in others. Some biased processes may also be more associated with political extremism—whether on the left or right—than with one side or the other (Imhoff et al., 2022). The very idea of quantifying equality of bias is elusive. The specific psychological processes studied, the definitions of those processes and ways that those processes are measured and manipulated, and the outcome variables studied determine how bias appears to differ by ideology.

Some scholars have argued that the overrepresentation of liberals in academia compared with conservatives may have created an overrepresentation of work showing bias in conservatives rather than liberals (Brandt & Spälti, 2017; Ditto et al., 2019; Duarte et al., 2015; Jussim et al., 2015). Research conclusions in the field consistently present liberals in a more positive light (Jussim et al., 2015). Social psychologists have spent much effort researching confirmation bias and motivated reasoning, yet ironically, these same processes may hamper the value of their work. People seek out ideas that confirm their preexisting beliefs (Duarte et al., 2015; Nickerson, 1998), so liberal researchers may be more likely to conduct studies, design analyses, and publish conclusions that elevate their own political peers and scrutinize their opposing partisans (Duarte et al., 2015). An overabundance of research that has investigated conservatism, rather than liberalism, as a deviation from the norm may have led the field to overlook important questions and insights (Brandt & Spälti, 2017; Duarte et al., 2015). This could be because research that examines liberalism with more scrutiny may be unwelcome in the field (Duarte et al., 2015; Jussim et al., 2015). Literature on polarization should be understood in the context of these and other factors that motivate researchers. Encouragingly, research with stronger political slants, either liberal or conservative, is less replicable, but the direction of political slant (liberal or conservative) does not relate to replicability (Reinero et al., 2020). This possible liberal bias in the literature should both encourage consumers of research to understand the literature within this context and encourage researchers to mind their own potential biases and support increased diversity in the field.

Individual-level processes for interventions

The work we summarize demonstrates psychological differences between liberals and conservatives, but we note that some of this work is conflicting and effect sizes can be small. Psychological processes can vary

across situations and in response to different issues, and small effects can be meaningful depending on the type of manipulation used and particulars of the studies conducted (Prentice & Miller, 2016). This review provides researchers with knowledge of psychological processes that can emerge and may differ between liberals and conservatives, regardless of whether they always emerge, which contributes to the scientific understanding of polarization. It can also advance the practice of depolarization when supplemented with work that examines how and when such processes function across contexts (Mook, 1983).

A range of research has examined how to make use of the individual-level processes that we discussed in climate change depolarization interventions. There may still be some opportunity for this, particularly in further exploring the key strategy of circumventing solution aversion by foregrounding climate change solutions that are more palatable to individuals of both ideologies. However, we turn now to discussing group-level processes that relate to climate change polarization and how group process-based interventions may be more promising.

Group-Level Polarization Processes

The social groups with which people align themselves can influence their political attitudes and thus drive political polarization. The social group that is most relevant to political contexts is undoubtedly one's political party; identifying with one party or the other often is synonymous with polarization (Achen & Bartels, 2019; Mason, 2015; Pierson & Schickler, 2020). Table 2 presents the key group-level polarization processes, their definitions, and suggested lines of future research. Group-level processes can be leveraged in interventions to both reduce polarization and bypass polarization. Interventions that reduce polarization reduce the gap between opposing political parties in climate change attitudes and behaviors. Interventions that bypass polarization leverage processes unrelated to partisan identification to make this gap less relevant. We aim to summarize the group-level polarization research to provide a basis for future work for polarization researchers and those who work on translating scientific findings into actionable polarization interventions.

Political ideology and its related processes are distinct from partisan identification (Abramowitz & Saunders, 2006; Jost et al., 2008; Malka & Lelkes, 2010). Political ideology is an individual-level psychological process, whereas partisan identification is a group-level processes. The correlation between political ideology and partisan identification in the United States has increased in recent decades such that Democrats have become more uniformly liberal and Republicans have become more uniformly conservative (Klein, 2020). Much recent work has reported strong correlations between political ideology and partisan identification, with exact correlations varying depending on how the constructs are measured, but one study found the correlation to be $r = .57$ ($p < .001$; Cole, Ehret, et al., 2022). The increasing correlation between ideology and partisan identification in the United States may have increased polarization (Mason, 2015). Political ideology can lead to partisan identification or vice versa (Jost et al., 2003), yet theoretically, individuals' beliefs about government and society are distinct from the political groups with which they identify. Although the correlation between political ideology and partisan identification is high at present in the United States, other time periods and other countries show less of this relationship. Thus, understanding political ideology and partisan identification as theoretically related but distinct constructs can aid in the generalizability of polarization research to countries and time periods in which ideology and party may not correlate as highly.

Scholars have argued that partisan identification is perhaps the most prominent influence on political behavior (Converse, 2006; Huddy et al., 2015; Jacoby, 2010; Lenz, 2009; Mason, 2015). Much political science work on polarization focuses on how political elites polarize public opinion (e.g., Zaller, 1992). People follow elites from their political ingroups and oppose elites from their political outgroups, in part because they like and trust those in their own party and dislike and distrust those in opposing parties (Cole, Flores, et al., 2022; Druckman et al., 2021; Finkel et al., 2020; Flores et al., 2022; Iyengar et al., 2019). And elites influence public opinion partly by providing information about what the social norms are within parties (Cole, Ehret, et al., in prep; Ehret et al., 2018; Van Boven & Sherman, 2021). Most Americans do not define the major political parties by their ideologies; they define them by group divisions (Abramowitz & Saunders, 2006; Converse, 2006; Hyman, 1959; Iyengar et al., 2012; Klein, 2020).

Understanding the group-level processes comprising and related to partisan identification is critical to understanding political polarization. Interventions that target group-level processes may be more effective than those that target individual-level processes (Fritsche et al., 2018; Iyengar et al., 2012; Masson & Fritsche, 2021; Pearson et al., 2016). Thus, interventions addressing and leveraging partisan identification could be more promising than interventions reviewed in the previous section.

Table 2. Group-Level Psychological Processes That Drive Political Polarization, Their Definitions, and Related Research Directions for Interventions That Depolarize Climate Change

Group-level psychological process	Definition and examples	Research directions to develop depolarization interventions
Social identities	Classification of oneself and other people into social groups, as part of one's self-concept	• *Key strategy*: identifying and leveraging superordinate, nonpolitical identities in climate change communications
Social norms	Typical or trending attitudes and behaviors within social groups, which define the social identities of those groups	• *Key strategy*: identifying and correcting misperceived norms within political parties regarding climate change and communicating about the prevalence and/or increase of positive climate change-related norms • Investigating the potential to improve social norms within political parties of climate change-related attitudes and behaviors
Affective polarization	Positive feelings and trust toward members of one's own group and negative feelings toward and distrust of other groups, resulting from classification of the self and other people into social groups	• Determining whether members of parties on the political right trust information from markets and the private sector more than information from scientists • *Key strategy*: foregrounding widely trusted leaders to communicate about climate change, including science and policy experts • *Key strategy*: communicating about bipartisan support from the general public or elites for potential climate change solutions

Social identities

Membership in a political party is a social identity. Social identities are one of the most important parts of the self-concept (Tajfel & Turner, 2004; Turner et al., 1987). A social identity comprises membership in a social group (Hornsey, 2008; Onorato & Turner, 2001; Tajfel & Turner, 2004; Turner et al., 1987), and people adopt the values and behaviors of their groups to maintain their senses of belonging (Berger & Heath, 2008; Chan et al., 2012). The need to belong is one of the primary psychological needs (Baumeister & Leary, 1995); thus, the drive to seek and maintain group membership is powerful. The drive toward social groups has evolutionary roots (Brewer & Caporael, 2013); survival as an individual is almost impossible without the resources and skills gained by working together with other individuals (J. Henrich, 2017). *Social identity theory* and *self-categorization theory* describe the psychological drive to maintain group membership. Per the theory of *identity-based motivation*, identities guide how people are motivated to act, what they are motivated to believe, and what their goals are (Oyserman, 2009).

Individuals sort themselves into groups easily and judge other people on the basis of group memberships (Mackie, 1986). Tajfel (1970) demonstrated this in early work on social identity theory. He asked participants to estimate the number of dots in a cluster and then told them that some people systematically underestimate numbers of dots in such tasks and some people systematically overestimate. Tajfel sorted participants into groups of "underestimators" or "overestimators." When asked to allocate financial rewards and penalties to other participants, people gave more money to those in their group, notwithstanding the trivial basis on which those groups were formed. Tajfel (1970) deemed this the *minimal group paradigm*. Regardless of whether groups share beliefs and ideologies, and regardless of the strength of the basis on which groups are formed, people prefer their groups, are influenced by their groups, and follow their groups (Tajfel et al., 1971).

Apply social identity to environmental contexts, the *social identity model of pro-environmental action* emphasizes the role of social identities in motivating climate action (Fritsche et al., 2018; Masson & Fritsche, 2021). Because political identities are especially salient and powerful in the climate change context, and Democrats and Republicans demonstrate polarized attitudes surrounding climate change (Doell et al., 2021; Van Boven et al., 2018), priming political identities widens the partisan gap on the issue (Guilbeault et al., 2018; Unsworth & Fielding, 2014).

Goldberg, Gustafson, et al. (2019) described a promising approach to bypassing polarization by engaging a

nonpolitical identity. They communicated about climate action as stewardship to protect "God's creation" and emphasized the moral aspects of addressing climate change. Their Christian participants reported increased belief in climate change, belief that climate change is anthropogenic, worry about climate change, and willingness to join a political effort to convince politicians to take climate action. This social identity effect can be understood as a result of identity processes as well as other psychological processes that relate to polarization, including morality and social norms, which are discussed in the following section. The experimental manipulation led participants to view climate change as more of a moral or religious issue, and it also increased beliefs that other people in the religious community thought that environmental protection was important (Goldberg, Gustafson, et al., 2019). Another study found that priming parental identity increased Republicans' climate change mitigation intentions but decreased Democrats' intentions (Diamond, 2020). Researchers can examine the potential of designing climate change communications that appeal to other nonpolitical identities to bypass polarization (Klandermans, 2002), with consideration of how various identities may function differently for members of each party.

Levels of identity. Self-categorization theory (Onorato & Turner, 2001; Turner et al., 1987) describes how individuals have varying levels of identities, and some of these identities—superordinate identities—overpower others (Onorato & Turner, 2001). Identities range from high-level status as a human being, mid-level status as part of a social group, and status as an individual with personally unique characteristics. The identities (and level of identities) that drive attitudes and behaviors in a given context are those that are most salient and relevant to the context at hand (Hornsey, 2008; Turner et al., 1987). Per the theory of *situated identities*, different contexts can change the salience and meaning of individuals' various identities (Oyserman & Schwarz, 2017).

When primed to think about superordinate identities rather than polarized identities, people are more willing to trust, cooperate with, and respond to the needs of those from outgroups. For example, in one experiment, participants primed to think about being an American were more supportive of increasing taxes to improve public education than participants primed to think about racial identities such as being White or African American (Transue, 2007). When approached by someone of a different race at a football game, White fans were more likely to comply with an interview request by a Black person when that person was wearing clothing of the same team (Nier et al., 2001). Superordinate identities can be strengthened when groups work toward common goals. In an experiment at the summer camp of Robber's Cave, researchers sorted boys into groups arbitrarily and pitted these groups against each other in competitive games, creating prejudice and animosity between groups. The researchers then had the two groups work together toward a superordinate goal, and this animosity and ingroup preference disappeared. This experiment established *realistic group conflict theory* (Sherif, 1961).

Leveraging nonpoliticized identities that are superordinate to partisan identification might improve climate change attitudes and behaviors. Several studies have tested the effects of global identities—identification with the whole human race as a social group—and found that the salience of global identity increases support for pro-environmental and other globally beneficial behaviors (Loy & Reese, 2019; McFarland et al., 2019; Römpke et al., 2019). The experiences of being respected and having international contact with other individuals can foster global identity (Renger & Reese, 2017; Römpke et al., 2019). McFarland et al. (2019) reviewed theories and literature about global identity and found that it positively predicted engagement in collective action behaviors for the reduction of global suffering and inequality (McFarland et al., 2019). Loy and Reese (2019) posited that mind–body practices such as yoga emphasize connecting with all human beings. They demonstrated that engagement in mind-body practices predicted global identity, which in turn predicted pro-environmental behavior (Loy & Reese, 2019). For a superordinate identity to be effective at bridging polarization, it must be believable and relevant to the target audience. Researchers can examine other types of superordinate identities and their effects, such as identities as citizens of a nation, community members, members of shared hobby and interest groups, members of professional organizations, and others.

System justification and social groups. As discussed, people differ in the value they place on maintaining the status quo of the social order, and this can create or exacerbate polarization (Jost et al., 2004). This process is related to people's perceptions of the needs of their social groups. Individuals who benefit from the present social order may show higher system justification and value the needs of their own group more than the needs of others because they stand to lose from changes to the existing system. Or sometimes, the reverse can be true—individuals harmed by the present social order can sometimes show higher system justification (Jost et al., 2004), encompassing a lack of preference for placing the needs of their group over the needs of other groups. Although their group would stand to gain from changes to the existing system, they justify their present misfortune by

supporting the present social order. Irrespective of which groups show higher system justification, it is useful when examining polarization to understand that polarization can relate to people seeking benefits for their groups by maintaining the status quo of the social order. Thus, to more thoroughly understand how the tradeoffs between the needs of various groups relate to climate change polarization, future work can examine when and how system justification influences and interacts with the other processes of social identities and group membership.

Social norms

The psychological process of social identities—and thereby of partisan identification—is closely related to the process of *social norms*. Social norms of a group describe how to maintain the group's social identity (Hogg & Reid, 2006). Perceived social norms are individuals' impressions of how others behave, how others think, and how others think that people should think and behave (Miller & Prentice, 2016; Prentice, 2018; Tankard & Paluck, 2016). There are two types: descriptive norms, which encompass attitudes and behaviors that are typical, and injunctive norms, which encompass attitudes and behaviors that are desired (Legros & Cislaghi, 2020). Norms can be static, comprising perceptions of what people currently do or think, or they can be dynamic, comprising trends in how certain attitudes and behaviors are becoming more or less common (Sparkman & Walton, 2017).

Norms consistently affect both cognition and behavior across contexts (Ajzen & Madden, 1986; Miller & Prentice, 2016; Sherif, 1936; Tankard & Paluck, 2016; Terry & Hogg, 2001), including in the environmental and climate change domains (Cialdini & Jacobson, 2021). Jetten et al. (1996) demonstrated that ingroup norms can drive or mitigate intergroup discrimination. Bicchieri (2002) discussed how communication that activates group identities and employs social norms can contribute to motivating collective action.

Normative information from individuals who share similar social identities is more powerful than normative information from those who are less similar (Abrams et al., 1990; Cialdini & Jacobson, 2021). The more consistently a certain bit of information about how to think or act comes from an ingroup, or the more proximal in space and time the group from which that information comes is, the stronger the social influence of that information will be (Abrams et al., 1990). Further, norms may be more influential when they are conveyed by individuals who are more prototypical of a relevant social group (Abrams et al., 1990; Hogg & Reid, 2006).

Social norms certainly play a role in climate change-related attitudes and behaviors (Cialdini & Jacobson, 2021; van der Linden et al., 2015). Goldberg et al. (2020) found that across nine representative samples, there was less difference between liberals' and conservatives' climate change beliefs for people with close friends or family members who set examples of believing in and caring about climate change. Goldberg, van der Linden, et al. (2019) found that discussing climate change with friends and family led to a greater understanding of the scientific consensus about climate change, and this led to greater belief in climate change. Communications leveraging dynamic norms and conveying that climate change mitigation behaviors such as reduced meat consumption are increasing can also promote environmentally friendly behaviors (Sparkman et al., 2020; Sparkman & Walton, 2017).

Social norms relate to and influence environmental policy support as well (de Groot & Schuitema, 2012; Rinscheid et al., 2021; Sherman et al., 2022). Fielding et al. (2020) discussed how support for a climate policy is higher when one's political ingroup supports the policy. Cole, Ehret, et al. (2022) demonstrated that both Democrats and Republicans prioritize climate change more relative to other policy issues when other people from their political parties prioritize it. Such social norms from one's political ingroup related to people's own prioritization of climate policy over and above personal characteristics classically studied in the individual-level processes literature, including ideology, identities, and values (Cole, Ehret, et al., 2022). Rinscheid et al. (2021) showed that negative norms of environmental behavior (i.e., peers not behaving environmentally) had a stronger effect than positive norms (i.e., peers behaving environmentally) on people's support for policies to phase out fossil fuel cars. E. Campbell et al. (2021) demonstrated that people who reported talking with family and friends about climate change also were more likely to express that climate change was the most important voting issue.

A key to leveraging social norms in depolarization interventions is that perceptions of social norms are malleable. One of the aforementioned experiments found that an infographic demonstrating Democratic and Republican party norms for prioritizing climate change above other policy issues was able to successfully change participants' perceptions of each party's norms, even such that participants believed that Republicans prioritized climate policy (Cole, Ehret, et al., 2022). Another study found that as participants were provided information about their party's stances, they dynamically updated their views of their party, even within a single experiment (Macy et al., 2019). Future work can scale social norms interventions to increase support, intentions, and actions for climate change mitigation.

Elites polarize through social norms and social identities. Signals from political elites communicate how to maintain the social identities of the political parties they lead (Cohen, 2003; Druckman et al., 2013; Zaller, 1990, 1992, 1994), in part by communicating social norms of their parties (Cole, Ehret et al., in prep; Ehret et al., 2018; Van Boven et al., 2018; Van Boven & Sherman, 2021). As discussed, polarization among the general public can influence polarization among political elites, and the reverse is also true (Budge & Hofferbert, 1990; Burstein, 2003; Cole, Ehret, et al., in prep; Druckman et al., 2013; Egan & Mullin, 2017; Flores et al., 2022; Hetherington, 2001; Stimson et al., 1995). Accordingly, the influence of political elites has been one of the most widely studied drivers of polarization, particularly in political science (Zaller, 1990, 1992, 1994). Elite influence can overpower political ideology (Cohen, 2003; although not in every context, Bullock, 2011). People have been shown to align their policy stances with elites in their parties regardless of whether the policies align with their ideologies (Cohen, 2003; Zaller, 1990, 1992, 1994), by the *party over policy* effect (Cohen, 2003). In the original research on this effect, Cohen (2003) presented undergraduate students with welfare policies designed to align with either liberal or conservative ideology. Participants were told that the policies were supported by Congressional representatives from either the Democratic or Republican party. Participants' support was influenced by elite stances more than by whether the content of the policy was liberal or conservative. The influence of political elites has been demonstrated in the contexts of abortion (Arceneaux, 2008), the COVID-19 pandemic (Cole, Flores, et al., 2022; Flores et al., 2022), and environmental regulation (Jerit, 2013). Party endorsements of policies affect personal policy stances more when parties are strongly polarized on an issue (Druckman et al., 2013).

Political elites influence climate change attitudes and behaviors (Cole, Ehret, et al., in prep; Ehret et al., 2018; Tesler, 2018; Van Boven et al., 2018; Van Boven & Sherman, 2021). Bolsen et al. (2019) compared the influence of messages from Democratic party leaders, Republican party leaders, military leaders, and climate scientists about climate change. They found that Republican party leaders and military leaders were most effective for participants from both parties (Bolsen et al., 2019). Nonpolitical elites can also be influential. One study found that seeing a picture of Pope Francis increased perceptions of climate change as a moral issue among both Democrats and Republicans (Schuldt et al., 2017). Another study by Goldberg et al. (2021) examined the effects of messaging about climate change by Republican leaders that was designed to appeal to conservative values. They conducted a field experiment using the New Climate Voices campaign, which disseminated videos and banner advertisements about climate change that emphasized conservative ideology and religiosity and were presented by conservative authority figures as spokespeople, including an Air Force General (Ron Keys), a Christian climate scientist (Dr. Katharine Hayhoe), and a former Republican representative (Bob Inglis) (Goldberg et al., 2021). This campaign succeeded at improving Republicans' belief in and understanding of climate change. Of note, this intervention combined strategies of appealing to conservative ideology—an individual-level process—with communications by Republican leaders to leverage partisan identification—a group-level process. The effectiveness of this intervention may have been due to the individual-level or group-level strategy or an interaction of the two, and future research can examine whether strategies at the two levels are more effective when used together.

Political elites' climate policy stances can convey information about broader social norms of policy stances among the general public (Ehret et al., 2018; Van Boven et al., 2018; Van Boven & Sherman, 2021). Participants in one study were provided with information about political elite climate policy stances but not about social norms, and they assumed that ordinary citizens' stances aligned with their party elites. In turn, these assumed ingroup peer stances from one's own party influenced personal policy support (Ehret et al., 2018). As such, the influence of political elites can partly be explained by their communication of social norms. In other contexts, elite influence and social norms may function independently. Participants in another study who received information about social norms that conflicted with elite stances did not entirely follow the norms over elite stances in their own climate policy support (Cole, Ehret, et al., in prep). Future work can examine the potential of leadership in the climate change domain from various elite sources, and test whether these sources influence perceived social norms, which could strengthen their influence. Future work can also explore how communicating about social norms may lessen the negative impact of elites who oppose climate change action.

Ingroup norms versus outgroup norms. Related research has examined whether individuals are more driven to adhere to their own groups or distinguish themselves from opposing groups. Early social identity work showed strong dissociation from one's outgroup (Tajfel & Turner, 2004; Turner et al., 1987) because a scarcity of resources can lead to hostility toward groups that are perceived to have more of those resources (Tajfel & Turner, 2004). More recent work has shown that people are also, or perhaps more, strongly driven to signal that they decidedly are members of their ingroups (Chan et al., 2012; Cole, Ehret, et al., 2022; Iyengar et al., 2012; Mackie, 1986).

Research on climate change polarization is informative as to whether individuals are more influenced by their ingroups or outgroups. In one of the studies discussed earlier, Cole, Ehret, et al. (2022) found that people's prioritization of climate change compared to other policy issues was strongly influenced by their political ingroup's prioritization but not their political outgroup's prioritization. Ehret et al. (2018) found that perceived ingroup norms of climate policy support related to one's own support of climate policy, but perceived outgroup norms did not. It is possible that individuals are not influenced by outgroup attitudes when they have information about ingroup attitudes, but when they do not know their ingroup's attitudes, they assume that their ingroup opposes their outgroup and thus adopt stances opposing their outgroup. Indeed, people assume that Democrats and Republicans hold opposing stances on modern policy issues such as climate change (Chambers et al., 2006; Gromet & Van Boven, 2014; Westfall et al., 2015). Researchers can further explore the boundary conditions of the effect the outgroup on climate change attitudes. For instance, if it is true that outgroup stances do not have as much influence when ingroup stances are known, then communications that specifically provide information about both Democrats' and Republicans' support of a proposed climate change solution can ensure that individuals from both parties understand their ingroup's positive stances.

Pluralistic ignorance, the false consensus effect, and false polarization. People often misperceive social norms (Ecker et al., 2022; Prentice & Miller, 1996; Ross et al., 1977). This is called *pluralistic ignorance*, in which perceived social norms of attitudes and behaviors are widely misperceived, and often perceived to be different than one's personal attitudes and behaviors (Sargent & Newman, 2021). Conversely, people can misperceive norms in the other direction; the *false consensus effect* describes how people project their own beliefs onto others and think their own beliefs are more common than they actually are (Ecker et al., 2022; Ross et al., 1977). Another related process is *false polarization*, in which social norms are misperceived in such a way that people think others are more polarized than they actually are (Blatz & Mercier, 2017; Fernbach & Van Boven, 2022; Lees & Cikara, 2021). Misperceived norms can drive group members to behave in ways that are undesirable, if people align their personal attitudes and behaviors to negative misperceived norms. Correcting misperceptions of norms can bring individuals' attitudes and behaviors in line with the true norm (Prentice & Miller, 1996; Ruggeri et al., 2021), which can be a valuable intervention strategy when true norms are more positive than misperceived norms. Seminal work on the topic of correcting pluralistic ignorance demonstrated that college students often overestimated how much alcohol other college students drank, but communications about actual drinking behaviors corrected perceptions of the norm, lessened perceived peer pressure to drink, and reduced binge drinking on college campuses (Prentice & Miller, 1993).

Leviston et al. (2013) demonstrated the false consensus effect in the context of climate change. Most of their respondents perceived that other people in their community shared their personal beliefs about the existence and causes of climate change. Embedded in this pattern was the overestimation of the percentage of people expressing a belief that climate change is not happening, which represents a pluralistic ignorance effect (Leviston et al., 2013). Van Boven et al. (2018) provided a more recent demonstration of pluralistic ignorance of other people's belief in climate change. They asked Democratic and Republican participants to estimate other individuals' belief in climate change, and people underestimated average belief in climate change within both parties. Democrats are perceived to believe in climate change, but not as much as they actually do. Further, Republicans are perceived as climate skeptics, but the majority actually do believe in climate change (Van Boven et al., 2018). Sparkman et al. (2022) demonstrated pluralistic ignorance surrounding support for climate policy such that Americans of both political parties severely underestimated support among other Americans. Climate change-related attitudes were even significantly underestimated among Democrats. This finding may seem counterintuitive in the context of much other work showing Democrats' concern for climate change and support for mitigation strategies, but it is a finding that also highlights an intervention opportunity to correct such misperceived norms. These authors stressed that these misperceived norms are so severe that people are conceiving a "false social reality" on the issue of climate change (Sparkman et al., 2022). Future research can examine how to scale interventions that correct such misperceptions, which can help reduce polarization (Doell et al., 2021). Researchers can also examine whether people underestimate support for a broader range of types of climate change solutions, such as private sector solutions or nuclear power.

Affective polarization

Group boundaries create and are exacerbated by affective polarization. Affective polarization encompasses the polarized feelings that people have toward members of their own groups versus members of other groups. It is sometimes called sectarianism (Finkel

et al., 2020) or social polarization (Mason, 2015; Simas et al., 2020) and describes the nonideological and nonattitudinal components of polarization. It encompasses warmth, liking, and trust (or coldness, dislike, and distrust) toward members of ingroup and outgroup parties (Druckman et al., 2021; Finkel et al., 2020; Iyengar et al., 2019). Polarized trust and liking for one's own party and distrust and disliking for opposing parties have increased in the United States and the United Kingdom in recent decades (Boxell et al., 2020; Iyengar & Krupenkin, 2018; Pierson & Schickler, 2020). Affective polarization can drive both positive and negative political acts such as activism and expressions of anger (Mason, 2015). People with higher levels of dispositional empathy experience greater affective polarization because they feel the concerns of their ingroup more strongly (Simas et al., 2020).

Across the globe, people like and trust ingroup political elites and dislike and distrust outgroup political elites (Cole, Flores, et al., 2022; Flores et al., 2022; Klein, 2020), and this is another part of the equation of why people follow elites from their political ingroups and oppose elites from their political outgroups (Cole, Ehret, et al., 2022; Cole, Flores, et al., 2022; Druckman et al., 2021; Finkel et al., 2020; Flores et al., 2022; Iyengar et al., 2019). Thus, differential trust in politicians from one's own party versus politicians from the opposing party can help explain why political elites influence personal policy attitudes; people align their policy stances with those whom they trust (Arceneaux, 2008; Cole, Flores, et al., 2022; Ecker et al., 2022; Flores et al., 2022; Haas & Khadka, 2020; Nicholson, 2012). It may be that elites influence personal policy attitudes through both social norms and affect toward elites; positive or negative affect toward various elites determines *who* people look to when deciding their own policy attitudes, and the communication of social norms may be *how* elites influence their personal policy attitudes (Cole, Pereira, et al., in prep).

Issue polarization and affective polarization can cause and exacerbate one another (Druckman et al., 2021; Fernbach & Van Boven, 2021; Iyengar et al., 2012; Jost et al., 2022; Rogowski & Sutherland, 2016; Simas et al., 2020; Van Bavel & Pereira, 2018; Webster & Abramowitz, 2017). In fact, affective polarization in the form of hating one's outgroup predicts sharing of fake news on Twitter, which in turn perpetuates issue polarization (Osmundsen et al., 2021). Affective polarization can also result from group-level processes unrelated to issue polarization (Iyengar et al., 2012).

The affective polarization literature speaks to the comparison between ingroup influence and outgroup influence. Brewer (1999) discussed how ingroup love is independent of outgroup hate; each one can be present without the other and they can have independent influences. Finkel et al. (2020) argued that outgroup hate is stronger than ingroup love, and people seek to oppose their outgroups more than they seek to follow their ingroups, contrary to some of the previously discussed literature demonstrating the strong drive to adhere to one's ingroup (Berger & Heath, 2008; Chan et al., 2012; Tajfel & Turner, 2004; Turner et al., 1987).

Research in the context of the COVID-19 pandemic demonstrates how affective polarization between political parties can be overcome by bipartisan and expert leadership. This is made possible by the fact that experts are generally trusted (Ecker et al., 2022). In a study conducted in April 2020, very early in the COVID-19 pandemic, Democratic and Republican participants in the United States and Labour and Conservative participants in the United Kingdom reported trusting politicians from their own political party more than those from the opposing party, and supported COVID-19 policies proposed by inparty elites more than those from outparty elites. However, participants reported trusting even experts more than they trusted politicians—even politicians from their own party—and supported proposals of policies to address the pandemic more when they were proposed by experts or bipartisan groups than when they were proposed by a group of politicians from a single party, even one's inparty (Cole, Flores, et al., 2022). Again, later in the pandemic, in a study spanning seven countries, people trusted and supported policies more from inparty elites than outparty elites. People also reported trusting experts more than both ingroup and outgroup politicians. Policies to address the pandemic were again more widely supported when proposed by experts or bipartisan groups than by politicians from a single party (Flores et al., 2022). In addition to these experiments testing the effects of hypothetical bipartisanship, evidence shows that Canadian elites displayed true cross-partisan consensus during the COVID-19 pandemic, which supported Canada's response strategy (Merkley et al., 2020). In another study, people underestimated medical doctors' trust in vaccines, but when provided with information to correct these misperceptions, they increased their trust in vaccines themselves, following experts' stances (Bartoš et al., 2022).

Researchers might explore how to increase trust in politicians from both parties, particularly people's trust in politicians from the opposing party. For example, studies can examine whether trust in outgroup politicians may be increased by providing information about how they advocated for or acted on the interests of those from other parties, or by describing why those politicians are considered trustworthy. Research should

also test the potential of leadership by bipartisan groups of politicians and experts to reduce climate change polarization (Cole, Flores, et al., 2022; Flores et al., 2022; Rinscheid et al., 2021).

Further empowering leadership by scientific experts, the *gateway belief model* describes how believing in a perceived scientific consensus on climate change leads to improvements in other climate change-related attitudes, feelings, and support for action (van der Linden, 2021). One study found that individuals across the political spectrum showed increased agreement that humans are causing climate change after reading about the scientific consensus (Lewandowsky et al., 2013; van der Linden et al., 2018); such communication reduces the partisan gap on belief in climate change and also overrides motivated reasoning among those on the right to deny climate change (van der Linden et al., 2018). These manipulations leverage both trust in expert leadership and social norms by communicating norms of consensus among experts about climate change-related facts (van der Linden, 2021). Although some research indicates negative reactance to the scientific consensus about climate change by those on the political right (Ma et al., 2019), particularly by those high in scientific literacy and numeracy (van der Linden, 2021), van der Linden et al. (2019) demonstrated that this effect is not often as much of a concern as previously thought, and that the scientific consensus can have a positive influence on those across the political spectrum. For Republicans, expressions of the scientific consensus from Republican leaders may be particularly effective. Both Democrats and Republicans are more influenced by communications about the scientific consensus from Republican leaders or from scientists than from Democratic leaders (Benegal & Scruggs, 2018).

Another approach is to draw on conservative trust in financial markets. Climate change prediction markets, in which people bet on the progression and impacts of climate change, may be a useful tool to communicate information about climate change (Roulston et al., 2022; Vandenbergh et al., 2014). Such markets can aggregate perceptions on topics such as increases in global average temperature, heat waves, intense precipitation events, sea level rise, and the likelihood of international or national climate measures such as carbon taxes. Several organizations have experimented with these markets in recent years, including Intrade, PredictIt, Kalshi, and the Winton Group. Research can examine whether conservatives might trust information about climate change and proposed climate change solutions from these prediction markets more than from other, more typical sources, in turn increasing belief in and concern about climate change.

Media and social media. Media—both news and social media—certainly exacerbates polarization (Kubin & von Sikorski, 2021). This may be because it communicates group norms, or because media sources are often associated with or trusted by one political party more than the other (Pierson & Schickler, 2020). Content about political and moral issues also spreads through online social media networks, especially when it contains emotional language (Brady et al., 2017; Burton et al., 2021), and emotional content that spreads on social media can affect people's beliefs regardless of the veracity of the information (Ecker et al., 2022). Political and moral content tends to lead to a contagion of views within but not across the boundaries of political groups (Brady et al., 2017). This is one feature of echo chambers—in which people are exposed on social media to views similar to theirs but not opposing views. Echo chambers can exacerbate polarization and extremism (Atari, Davani, et al., 2022). Relatedly, content disparaging the outgroup on social media tends to generate more engagement than content promoting the ingroup and ingroup views (Rathje et al., 2021). One study found that exposure to tweets by then-president Donald Trump expressing antivaccination sentiments increased vaccine hesitancy among individuals who had voted for Trump in the presidential election (Hornsey et al., 2020). Kubin and von Sikorski (2021) conducted a meta-analysis on political polarization and social media and found consistent evidence of social media increasing polarization. They called for more research on how to depolarize the effects of social media.

In the context of climate change, E. Campbell et al. (2021) demonstrated that participants who reported higher exposure to Fox News reported lower belief in climate change, lower perceived risk and worry about climate change, more negative norms surrounding climate change, and less discussion of climate change with family and friends. Gustafson et al. (2019) showed that exposure to Fox News led to decreased support for the Green New Deal among Republicans. Chinn et al. (2020) found that media communications about climate change have become more polarized in the past three decades, as well as more politicized.

A component of this increase in polarization in the media is the rise of "fake news," or media that exaggerates or falsifies information. van der Linden and colleagues have examined how to address this. Susceptibility to fake news is caused at least in part by heuristics people use to sort through the information in their environments, and we have a bias toward believing information presented to us, a bias toward believing information that is easy to process, and relatedly, a tendency to process intuitively rather than deliberatively. People can also forget sources of information,

allowing us to choose what information to believe on the basis of the content and not source credibility. Encouraging people to deliberate and reflect on the truth can help counteract some of these heuristics, as can interventions that undermine the logic of false information or the credibility of its sources, such as that of van der Linden et al. (2017). These strategies can be implemented before exposure to false information, termed "prebunking," or after exposure, termed "debunking" (Ecker et al., 2022). van der Linden et al. (2017) found that forewarning consumers of potential misinformation about climate change could inoculate them against believing scientifically incorrect facts. This inoculation process can be successful for both liberals and conservatives (van der Linden et al., 2017).

Group-level processes for interventions

When drawing from the research reviewed in this section on group-level processes to plan future research agendas and design interventions, it is important to remember that the processes covered in this section are closely entangled with the processes covered in the individual-level process literature. It is almost certainly the case that ideologies are influenced by identities and that people maintain identities that align with their ideologies, although literature supports the second process being stronger than the first. We categorized the social psychological polarization literature on the basis of whether it discusses processes that originate within the individual or by one's external group memberships, but these processes interact and some processes have both individual-level and group-level causes. Future theoretical research can continue to isolate and explore the causal relationships between the processes described in this article and their effects on climate change-related attitudes and behaviors. Future work designing interventions may benefit from combining various strategies.

Leveraging the group-level processes that we discussed may be a particularly promising route to designing interventions to depolarize climate change, more so than leveraging individual-level processes (Fritsche et al., 2018; Iyengar et al., 2012; Masson & Fritsche, 2021; Pearson et al., 2016). We encourage researchers in this field to prioritize studying how social identities, social norms, and affective polarization inform effective climate change communications that improve responses to climate change. In particular, we highlight as promising strategies (a) leveraging superordinate identities; (b) correcting misperceptions of social norms; and (c) having trusted leaders—whether political elites, other elites, or experts—communicate about climate change. Future research can contribute to understanding these processes, their mechanisms, and boundary conditions at a theoretical level, as well as designing and scaling interventions that leverage them.

Final Thoughts

The social psychology literature on political polarization provides a valuable and perhaps underutilized basis for designing interventions to address climate change polarization and polarization on other issues. Research on individual-level processes, which examines psychological processes of polarization that originate within the individual, indicates that communicating about and addressing climate change in ways that appeal to both liberals' and conservatives' underlying ideologies can increase support for climate change solutions. Research on group-level processes, which examines psychological processes of polarization that originate from external group influences, points to how leveraging social identities, social norms, and trust can help improve climate change responses. And because climate change is particularly polarized (APA Climate Change Task Force, 2022; Baldassarri & Park, 2020; Pew Research Center, 2020), an examination of the distinctive characteristics of the climate change problem and difficulties of responding to it can further the scientific understanding of polarization.

We propose that practitioners implementing interventions to depolarize climate change, and researchers seeking to further the scientific understanding of polarization, focus on the following strategies: (a) circumventing solution aversion by foregrounding climate change solutions that appeal to individuals across the spectrum of political ideologies; (b) leveraging superordinate identities, such as identification with one's country, to reduce the polarizing effects of partisan identification; (c) correcting misperceived norms (i.e., pluralistic ignorance) within political parties about negative climate change-related attitudes; and (d) having trusted experts and bipartisan groups of politicians communicate about climate change. We emphasize that interventions leveraging group-level processes may be more effective than those leveraging individual-level processes.

The work reviewed here should be considered while acknowledging limitations of potential generalizability. Future research should examine whether the work reviewed in this article can generalize to cultures beyond those that have been specifically studied, including, in particular, non-Western countries (J. P. Henrich et al., 2010; Rad et al., 2018). And while the research that we reviewed primarily examined Democrats and Republicans, or liberals and conservatives,

partisanship and ideology are not always one-dimensional and are not limited to these distinctions. Some research has examined libertarian ideology, which is characterized by a value of individual liberty (Iyer et al., 2012). Although Democrats and Republicans make up an overwhelming majority of Americans (Cole, Ehret, et al., 2022), the scientific understanding of the concepts discussed in this article can nonetheless be enriched by research on a more diverse set of ideologies and political parties. The understanding of political polarization developed in the climate change context in this article can also inform responses to other politically polarized issues, and future research might apply the intervention techniques identified in this review to other urgent societal challenges.

Climate change is one of the most pressing issues faced by modern society, and it is plagued by political polarization that, in the United States in particular, intersects with governmental structures to block governmental responses. Given the constitutional design in the United States, reducing or bypassing such political polarization is essential for adoption of major federal pollution control measures and thus for reducing the risk of significant harm to society. Social science researchers have much to do to help society surmount the political polarization that impedes progress on climate change and other polarized issues, and this article can provide a basis for much more fruitful social psychology work on the topic.

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J. C. Cole, A. J. Gillis, and M. P. Vandenbergh conceptualized the project. J. C. Cole wrote the first draft of the manuscript. All the authors reviewed and commented on the manuscript and approved the final manuscript for submission.

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