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A motivational systems approach to investigating opinions on climate change

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ABSTRACT

Understanding how people form opinions about climate change has proven to be challenging. One of the most common approaches to studying climate change beliefs is to assume people employ motivated reasoning. We first detail how scholars in this area have applied motivated reasoning perspectives, identifying a variety of different judgment goals on which they have focused. We next argue that existing findings fail to conclusively show motivated reasoning, much less isolate which specific goals guide opinion formation about climate change. Then, we describe a novel *motivational systems* framework that would allow a more precise identification of the role of motivated reasoning in such opinions. Finally, we conclude by providing examples from completed and planned studies that apply this framework. Ultimately, we hope to give scholars and practitioners better tools to isolate why people hold the climate opinions they do and to develop effective communication strategies to change those opinions.

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Given the uncertainty inherent in conducting even the best science, the consensus on climate change is staggering. Recent estimates suggest that over 90% of climate scientists believe that humans are a contributing, if not the primary, factor in climate change (Cook et al., 2016). That level of consensus approaches what is found on other universally accepted scientific principles, such as the process of natural selection or the germ theory of disease. Yet, whereas scientific consensus has largely translated into public belief with these other examples, deep divisions in people's beliefs about climate change remain. For example, a 2018 survey of Americans suggests

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that nearly half of the country does *not* believe climate change is primarily due to human activity (Pew Research Center, 2018).

In seeking to explain this science-public disconnect, one prominent idea has been that people who reject this consensus engage in *motivated reasoning*. Such reasoning occurs when people's needs, drives, desires, or goals affect the way in which they search for, encode, evaluate, or remember information (see Kruglanski, 1996; Kunda, 1990; Molden & Higgins, 2005, 2012). That is, when seeking or accepting the truth of some proposition hinders the fulfillment of a valued goal, people process and evaluate that proposition in a way to protect broader, goal-consistent outcomes. Acknowledging humankind's role in climate change, and the resultant alterations in behavior that would be required to arrest such change (e.g., increased regulation, higher government spending), conflicts with a host of economic and political interests. Consequently, some individuals are presumed to evaluate information about climate change with the goal of protecting such conflicting interests (e.g., Hart & Nisbet, 2012; Kahan, 2016; Palm et al., 2017; Zhou, 2016). That leads these individuals to reject ideas that humankind has a role in climate change or even that it is occurring at all.

In this article, we present a critical review and expansion of a motivated reasoning analysis of people's beliefs about climate change. We begin with an overview of the evidence that is often cited to support the proposal that people process information about climate change in a motivated way. Within this overview, we carefully evaluate both (a) the variety of different types of goals that researchers have proposed under the general label of "motivated reasoning", and (b) the limitations of existing findings for providing direct evidence of such reasoning. We then discuss what type of evidence is truly required to determine motivational influences on judgment (see Dunning, 2015) and present a *motivational systems* approach to studying climate change beliefs that introduces some important principles for how to gather such evidence. Finally, we describe new directions of inquiry that this motivational systems perspective unlocks, as well as some preliminary research we have conducted and are planning using this perspective.

The evidence for motivated reasoning about human-induced climate change

When people seek information, assess information, and use it to inform evaluations, they do so with various levels of effort and in the service of one or more motivations or goals (Fazio, 1990, 2007; Kruglanski, 1989). Motivation (or goals) refers to "cognitive representation[s] of desired endpoint[s] that impact evaluations, emotions and behaviors" (Fishbach & Ferguson, 2007, p. 491).

Striving to obtain a goal motivates actions that are perceived as best suited to bring about the desired endpoint. Although much research considers how various goals can influence people's actions when forming opinions on climate change, as we describe in the following sections, researchers have not always fully articulated the types of goals they believe to be operating or how these goals compare to others that have been studied in this context. Moreover, as we also discuss, much of the existing evidence presented as demonstrating motivational influences on climate change opinions is indirect and less conclusive than it is frequently regarded to be (see also Baron & Jost, 2019; Tappin et al., 2020b).

Multiple goals are proposed to evoke motivated reasoning on climate change

The literature on climate change opinion formation posits that many people form these opinions in the service of what is typically labeled a *directional goal*. Directional goals involve gathering and processing information to support or confirm a specific desired conclusion, such as that climate change is a natural process over which humans have little control, or that it is not occurring at all. These goals contrast with *non-directional* goals that involve gathering and processing information in a way that is independent from specific conclusions; non-directional goals instead involve some broader objective, such as forming what one believes to be the most accurate possible opinion about climate change or achieving some personal sense of certainty about the issue, no matter what specific conclusion that leads one to embrace (see Dunning, 2015; Kunda, 1990; Molden & Higgins, 2012).¹ Importantly, it is worth noting that, despite often involving seeking accuracy or achieving certainty, non-directional goals do not guarantee more effortful information processing or less-biased conclusions (see Druckman & McGrath, 2019; Tappin et al., 2020b).

Both directional and non-directional goals can profoundly influence people's judgments. However, when researchers evoke the concept of "motivated reasoning," particularly regarding climate change opinions, they

¹The distinction between non-directional and directional goals has also been described by Kruglanski and colleagues in terms of needs for *non-specific closure* versus needs for *specific closure*, respectively (see e.g., Kruglanski, 1999; Kruglanski et al., 2020; Kruglanski, Jasko, & Friston, 2020). In this formulation, strong needs for non-specific closure involve seeking to establish a feeling of certainty in general, no matter what conclusion ultimately provides it, and closing oneself off to any type of information that could challenge this overall sense of certainty, akin to non-directional goals. Strong needs for specific closure involve seeking to establish a feeling of certainty about a particular desired conclusion and closing oneself off only to information that could challenge such certainty in this desired conclusion, as is true with directional goals. Therefore, whatever nuances might exist between definitions of different types of needs for closure and definitions of non-directional versus directional motivation, for the present discussion, we treat them as essentially equivalent.

Table 1. Examples of directional goals proposed in the context of “partisan motivations” surrounding climate change.

Type	Goal	Examples from climate change research
Social Consensus Seeking	To affirm status with and be informed by social network members (e.g., family, friends, and acquaintances)	Kahan et al. (2015) Kobayashi (2018)
Scientific Consensus Seeking	To be informed by scientific norms and beliefs	van der Linden et al. (2018)
Value Affirmation	To uphold valued priorities	Wolsko et al. (2016) Campbell and Kay (2014)
Cherished Belief Maintenance	To reduce perceived threats to personally important beliefs	Feldman et al. (2014) Ma et al. (2019)

most frequently are either implicitly or explicitly referring to directional goals (although we return to non-directional goals in later sections). Consider the three distinct processes that encapsulate Lodge and Taber’s (2013) analysis of motivated reasoning: The first is a *confirmation bias*, in which people selectively seek out and attend to information that coheres with a specific desired conclusion. The second is a *prior attitude effect*, in which people assess the quality of any new information they encounter based on whether it contradicts or supports a desired conclusion. The third is a *disconfirmation bias*, in which people place greater scrutiny on information that may undermine a desired conclusion and even actively generate counterarguments to oppose this information. All of these represent various means by which people may pursue directional goals in opinion formation.

A crucial question when analyzing directional motivated reasoning is, what desired conclusions are people seeking? Regarding climate change, researchers often consider this desired conclusion as representing the consensus of the political party that one most strongly supports and argue that “partisan motivations” can lead people to seek such conclusions (Bolsen & Druckman, 2018; Palm et al., 2017; Zhou, 2016). Yet, this broad label does not adequately reflect the variety of specific directional goals that people have been claimed to be pursuing when forming these opinions. Table 1 displays four examples of distinct directional goals that researchers have prominently invoked when investigating people’s beliefs in climate change. To illustrate the potential variety in these goals, we review each in turn below along with examples of associated research. Note that, rather than an exhaustive list of all possible examples of the motivated reasoning that has been discussed surrounding climate change, Table 1 represents a handful of the distinctions that could exist in such reasoning. We selected these examples to highlight both the importance of considering such distinctions and, as we subsequently discuss, the challenge of unambiguously demonstrating them.

Social consensus seeking

Among the specific directional goals investigated in the context of climate change, the ones most prevalent in the literature relate in various ways to people's concerns about their social connections with others (Baumeister & Leary, 1995). Perhaps most notable is people's proposed desire to maintain their sense of social consensus with groups that are particularly important to them. As shown in the first panel of [Figure 1](#) (data from League of Conservation Voters, 2020), elected officials in the U.S. have divided on environmental issues over the last quarter-century, and in so doing, politicized climate change: being a member of the Republican party denotes skepticism in human-induced change and being a member of the Democratic party denotes belief in such change. Given these stark differences, as mentioned, research on directional goals in forming opinions on climate change related to social consensus seeking typically examines people's affiliation with different political parties. As the second panel in [Figure 1](#) (data from Pew Research Center, 2007–2020) demonstrates, the opinions of U.S. citizens track the party elites. Palm et al. (2017) capture the prevailing sentiment in the literature that this divide thus constitutes "strong evidence for the theory of [directional] motivated reasoning ..." (p. 893); that is, such patterns of opinion reflect people's engagement in the motivated reasoning processes Lodge and Taber (2013) outline.

One view of these types of effects is that people seek consensus in the service of ensuring a sense of identification and connection with their political ingroups and "protect[ing] their connection to others with whom they have important material and emotional ties" (Kahan, 2015, p. 26). Indeed, beyond aggregate opinion data, experimental work more directly demonstrates that Republicans appear to selectively dismiss and counter-argue messages advocating human-induced climate change and related policies, presumably to prevent themselves from endorsing something that challenges the group consensus (e.g., Campbell & Kay, 2014; Hart & Nisbet, 2012; Zhou, 2016).

However, another view on the clear effects of social consensus seeking is that people's opinions converge with their extended social network not only because they want to feel a sense of connection or affirm that they are a "good" group member; this could also occur because people are motivated by beliefs that the views of people in these networks have informational value worth considering when forming their own views, especially under conditions of conflicting or ambiguous information. For example, Kobayashi (2018) provides experimental evidence that successful manipulations of participants' perceptions of social consensus influence their beliefs about scientific findings, independently of how much consensus there is

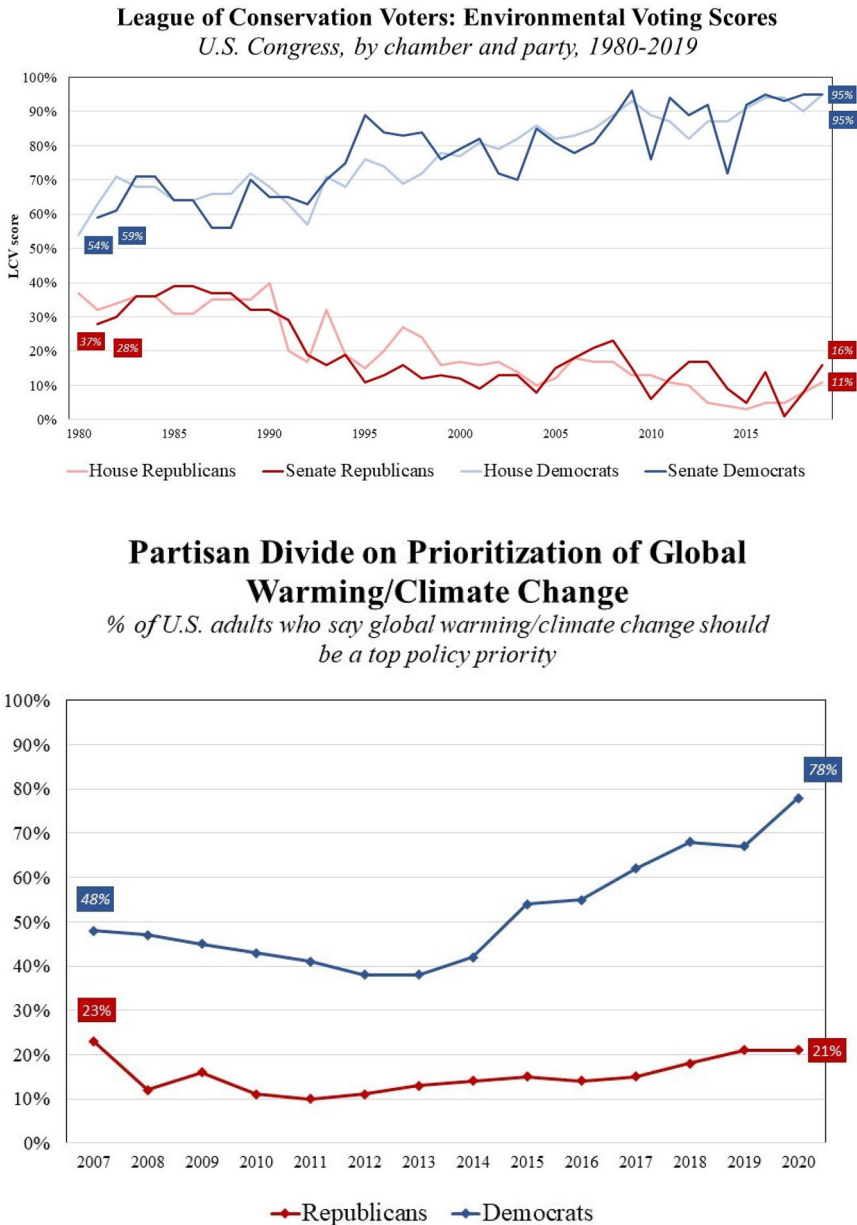


Figure 1. Elite voting and public opinion trends on climate change in the U.S.

among scientists themselves. That is, people often see the views of trusted interpersonal connections – which often include like-minded political partisans – as providing information distinct from that provided by experts. Furthermore, for two of the four science topics studied, an individual’s perceived social consensus on that topic significantly predicted his or her own

beliefs above and beyond perceptions of expert belief. In addition, social consensus may, at times, work to communicate information on and bolster the credibility of an existing scientific consensus; Goldberg et al. (2019) find that interpersonal discussion with friends and family leads people to learn more about scientific agreement on human-caused climate change, which in turn affects their climate change beliefs. Thus, it appears that directional goals for seeking social consensus can arise from desires to learn from, as well as fit in with, valued ingroup members (see also Deutsch & Gerard, 1955; Price et al., 2006).

Scientific consensus seeking

Another type of directional goal proposed to motivate people's processing of information about climate change involves seeking agreement with a valued group to which one does not currently, or even seek to, belong. In the case of scientific issues, in addition to seeing informational value in the consensus of their narrower ingroups, people may also at times see such value in the opinions of scientists and their own understanding of the general scientific consensus. These types of motivations underlie the well-known Gateway-Belief-Model (GBM; van der Linden et al., 2015) in that such a consensus creates "societal norms [that] help set standards against which people evaluate the appropriateness of their beliefs and behaviors" (van der Linden et al., 2018, p. 2).

Therefore, when people have directional motivations for attending to scientific consensus in the context of climate change, messages clearly presenting this consensus – e.g., "97% of climate scientists believe in human-caused climate change" – should produce better understanding of the consensus and, in turn, increase belief that climate change is happening, human-caused, and worrisome. Consistent with this proposition, van der Linden et al. (2015, 2019) find that regardless of people's prior beliefs, partisanship, value systems, or social networks, they, at times, evaluate such messages positively and shift their opinions to more closely cohere with scientific norms. Thus, not all directional goals necessarily produce group polarization in climate change opinions. The desire for seeking informational value in scientific consensus may increase shared opinions when people are provided with compelling information about this consensus.²

²These desires for consensus are not directly equivalent to desires to form as accurate an opinion as possible; although people may value the scientific consensus because they believe it is accurate, they have a specific goal to adopt that consensus without trying to evaluate the accuracy of those conclusions on their own. We discuss this distinction further below in the context of non-directional goals for accuracy.

Value affirmation

Beyond the direct social concerns highlighted in the previous examples, people have also been proposed to pursue more self-focused directional goals when reasoning about climate change. One example of this type of goal is the affirmation of one's commitment to important personal values. Research suggests that one source of these values is that, relative to people with more liberal ideologies, people with more conservative political ideologies prioritize what Moral Foundations Theory labels *binding* moral concerns, such as in-group loyalty, purity, and respect for authority (Graham et al., 2009). Thus, when conservatives hold the goal of affirming personal values, they may give greater weight to information relevant to these binding concerns. They may view messages that invoke loyalty, authority, and purity as stronger, counter-argue these messages less, and adopt more message-consistent opinions as a result.

This is exactly what an experiment by Wolsko et al. (2016) found: conservatives who read a message that framed combatting climate change as relevant to binding moral concerns believed more in and became more concerned about climate change. In fact, this message frame led conservatives to hold climate views that did not significantly differ from liberals. Because the message itself helped facilitate a directional goal of affirming important moral values, this message was more accepted and able to influence conservatives' beliefs, even when they held skeptical priors about climate change (also see Adger et al., 2017; Bayes et al., 2020; Feinberg & Willer, 2013).

Furthermore, other studies have found similar framing effects with non-moral values. For example, Campbell and Kay (2014) show that individuals inclined to favor free-market approaches to societal problems express more certainty in human-induced climate change when exposed to messages that framed climate change solutions as compatible with the free market, such as by suggesting the United States could profit from developing "green" technology (see also Kahan et al., 2015). These broader findings appear to suggest that in addition to the salience of moral values, the salience of outcomes that people personally value can also influence the way they reason about climate change.

Belief consistency

A final example of a proposed directional goal people adopt when forming opinions about climate change involves seeking consistency and stability in their cherished personal beliefs. Consistency motivations have long been studied in psychology (for a recent overview, see A. McGrath, 2017), and, in this context, reflect people working to maintain and support their pre-existing beliefs about climate change. For example, Feldman et al. (2014) show

that higher certainty of beliefs in global warming at one point in time (fall, 2008) led individuals to selectively expose themselves to different sources of information; they reported consuming significantly less conservative media, which tends to be skeptical of climate change, and more non-conservative media at a later point in time (spring, 2011). The authors argue that this suggests a motivation to protect one's important, established beliefs from the threat of disconfirmation and maintain their stability (see Harmon-Jones, 2019). Similarly, Ma et al. (2019) report that those who held skeptical prior beliefs about climate change reacted negatively when provided with a statement about the wide scientific consensus on human-induced climate change and felt that others were trying to force such opinions on them. This also suggests motivations to protect cherished beliefs, such that individuals appeared to evaluate the message with the goal of reducing the threat of the new information to their standing opinions (see Carpenter, 2019).

Thus, in summary, researchers investigating "partisan motivations" or "motivated reasoning" in the context of climate change have actually invoked a variety of potentially distinct directional goals that people might be pursuing when making judgments about climate change. However, scant attention has been paid to these possible distinctions and the further questions they could raise about the predominant motivational underpinnings of reasoning in this domain. Few studies have attempted to directly differentiate between the influence of these various directional goals, or even evaluated whether they are indeed functionally distinct – e.g., social consensus seeking and the affirmation of personal values strongly associated with an ingroup could potentially just be different manifestations of the same fundamental desires for affiliation that are motivating people's judgments.

Recognizing and more thoroughly understanding the potential variety in the goals that drive motivated reasoning is therefore critical; otherwise, researchers and communicators will not effectively capture the underlying causes driving such reasoning and thus be less able to identify effective messaging that might alter people's opinions on climate change. For instance, if a social consensus seeking goal often drives information processing about climate change, then messages that appeal to how others in the relevant social group think and behave will likely be more effective than other appeals. Indeed, Bayes et al. (2020) demonstrated that a message which revealed that a majority of Republicans now actually believe climate change is occurring effectively moved opinions of Republican participants who currently held a social consensus goal. Other messages, about the scientific consensus on climate change or how combatting such change was consistent with Republican values, did not change these

particular individuals' opinions. This illustrates the importance of analyzing the precise influence on information processing of specific goals. We return to these findings in more detail below.

Direct evidence for directional motivated reasoning on climate change is limited

When initially considering the variety of findings we have reviewed thus far, many might assume there is robust evidence for directional motivated reasoning on climate change. The extant literature, however, has two significant problems. The first problem is that, although some support exists for the influence of various directional motivations on people's climate change opinions there are a host of inconsistencies. For each type of directional goal we discussed, there are some findings that suggest it leads to motivated reasoning (e.g., the studies detailed above), but there are also findings that do not support such effects. Such studies call into question the impact on climate change opinions of desires to seek partisan social consensus (e.g., Bolsen et al., 2014; Ripberger et al., 2017), seek scientific consensus (e.g., Dixon et al., 2017; Kahan, 2017), affirm values (e.g., Severson & Coleman, 2015), and maintain belief consistency (e.g., van der Linden et al., 2019).

These conflicting findings may reflect a failure to fully appreciate the critical potential for heterogeneity in the goals that can motivate opinion formation on climate change we noted above and to carefully measure or manipulate such goals. It also may result from unintentional differences in the primary motivations evoked by researchers in the participants of two versions of similar studies with varying methods. Nevertheless, these mixed findings prevent clear conclusions about the prevalence of directional motivated reasoning on climate change.

The second problem with the current literature is that, although different collections of findings *are consistent with* the influence of particular goals, virtually no existing studies conclusively demonstrate that participants were actually pursuing such goals. Evidence for directional motivated reasoning requires documentation that individuals possess a directional goal and that they evaluate (or select) new information in a manner tailored to achieve that goal. But, as we elaborate upon more in the following section, these can be difficult conditions to verify. Most of the data used to support directional motivated reasoning are also consistent with individuals pursuing a non-directional accuracy goal (Druckman & McGrath, 2019, Tappin et al., 2020b).

Non-directional accuracy goals

Although the majority of the research on motivated reasoning surrounding climate change focuses on directional goals, it is important to note that some studies have also investigated the role of the non-directional goals mentioned at the outset. The non-directional goal that climate change scholars have almost exclusively examined (but, as noted above, is by no means the only possible type of non-directional goal) involves forming as accurate an opinion as possible – i.e., the opinion that is the “correct or otherwise best conclusion” (Taber & Lodge, 2006, p. 756). Thus, people with this goal still possess distinct motivations that guide information search and processing, but, in contrast to directional goals, they do not begin with a specific desired conclusion (Dunning, 2015; Kunda, 1990; Molden & Higgins, 2012). As alluded to earlier, it is important to distinguish non-directional accuracy goals from directional goals to follow scientific or social consensus. These latter directional goals may arise in part from a desire to be accurate, but, in those cases, people are pursuing “accuracy” through a specific outcome – i.e., agreeing with what they learn from the scientific community or their social network. In contrast, a non-directional accuracy goal means there is no pre-determined desire to agree with a group or arrive at a particular conclusion, and such a goal could at times produce disagreement with the consensus of scientists or one’s own social network.

Even when accuracy is one’s primary goal, what the “best” or “most accurate” conclusion entails is, of course, not always clear, and an accurate outcome is far from guaranteed. However, people motivated by accuracy would be expected to strive for objective “truth”, such as (a) dedicating a substantial amount of time and effort to gather information that could impact their opinion, (b) carefully evaluating the provenance of this information and the strength of the facts or arguments it presents, and (c) attempting to suppress biases in how standing beliefs or affiliations might color one’s search for and reaction to the information (e.g., Druckman & McGrath, 2019; Hill, 2017; Kahan, 2016).

Several findings suggest a role for accuracy goals in climate change opinion formation. For example, much past research demonstrates that when people form opinions about topics that are personally important, or that could have meaningful consequences for their own outcomes, accuracy motivations often prevail (see Eagly & Chaiken, 1993). Consistent with these findings, people who directly experience climate anomalies report increased belief in climate change, regardless of their standing beliefs or political affiliation. For example, Milfont et al. (2014) show those who live closer to shorelines, where the effects of climate change are more dramatic, exhibit greater belief in climate change and more support for climate policies, regardless of their economic situation and political orientation (see

also Ripberger et al., 2017; Scannell & Gifford, 2013; c.f., Gärtner & Schoen, 2021).

Observational equivalence of directional and non-directional goals

Given such independent evidence that non-directional accuracy goals can motivate reasoning about climate change, this creates some ambiguity in the findings offered as evidence for directional-motivated reasoning on climate change due to an observational equivalence problem. Tappin et al. (2020a, 2020b) make this point, arguing that that people's political or social identities are correlated with their standing beliefs and how these beliefs were formed. Most canonical tests of directional-motivated thinking assess how people evaluate information that counters or coheres with their identities, finding, for example, that Republicans versus Democrats generally reject versus accept, respectively, the results of a study demonstrating climate change. Moreover, such effects from tightly controlled experiments appear particularly strong among more cognitively sophisticated participants (e.g., Kahan 2015; Lodge & Taber, 2013; although see (Persson et al., 2021)). As Tappin et al. (2020a, 2020b) explain, the problem with exclusively inferring the effects of directional motivations in this case is that people's identities are often correlated with their exposure to and learning of what they consider "high quality" information (see also Druckman & McGrath, 2019).

For example, instead of reflecting a goal to protect cherished beliefs, Feldman et al.'s (2014) aforementioned evidence that conservatives seek out climate skeptical media could reflect a non-directional accuracy goal in which these individuals are searching for what they believe is the best information from sources they perceive as most credible. Similarly, instead of reflecting social consensus seeking goals, the partisan polarization depicted in Figure 1, could simply reflect partisans evaluating the opinions of elites in their party as reflecting more expertise, and being closer to the truth, than the opinions of the other party (e.g., Brulle et al., 2012; McCright & Dunlap, 2011; Tesler, 2018). Therefore, whenever people's beliefs appear to conform to the beliefs of a valued group, researchers should be cautious in interpreting the possible underlying motivations. Beyond political party, existing research has posited that individuals may be directionally motivated to conform to the beliefs of scientists, friends and family, or the general public (e.g., van der Linden et al., 2018; Kobayashi, 2018; for more discussion, see Bayes & Druckman, 2021). However, while adhering to group beliefs may indeed be evidence of motivated conformity with a social or scientific consensus, it is observationally equivalent to an accuracy-motivated individual who trusts norms among peers or scientists as a source of accurate information.

In short, when motivated by accuracy, Republicans who have accepted prior “evidence” inconsistent with climate change as true could carefully and effortfully evaluate new information, yet still not alter their beliefs because they end up critiquing anything inconsistent with the prior evidence they believe to be accurate. They may be incredulous about climate change not because they are specifically motivated to reject evidence supportive of this change, but because it contradicts what they believe to be the best evidence. Or, as Baron and Jost (2019) explain, “the true source of the alleged bias may be purely cognitive, with no [directional] motivation involved—that is, purely a case of beliefs affecting beliefs rather than desires affecting beliefs” (p. 296).

Tappin et al. (2020a) suggest that one way to differentiate directional and non-directional motivations is for studies to compare people’s updated beliefs after receiving new information against an “objective” Bayesian baseline where prior beliefs, by definition, also matter (also see Hill, 2017). When conducting such studies, they find scant evidence of deviations from this objective baseline and more cognitively sophisticated participants actually exhibit *less* bias (see also Tappin et al., *in press*), which contradicts the assumed influence of directionally motivated reasoning (e.g., Lodge & Taber, 2013).

In summary, most of the extant evidence that purports to demonstrate directional motivated reasoning is also consistent with non-directional reasoning. Tappin et al. (2020a) offer one approach to isolate the extent of directional reasoning by invoking a comparison with a Bayesian ideal. As detailed in the next sections, we take a different perspective. Specifically, we draw on psychological research that has explored the general operation of motivational systems to develop an approach that attempts to directly manipulate, rather than measure or infer, both directional and non-directional motivations and then assess subsequent changes in information processing (Touré-Tillery & Fishbach, 2014). This avoids observational equivalence problems and has the advantage of (a) allowing direct comparisons of what outcomes occur due to directional or non-directional goals, (b) directly intervening on the proposed mediating process, which avoids ambiguities about interpreting causal effects (see Pirlott & MacKinnon, 2016; Tappin et al., 2020b), and (c) informing practical messaging strategies that could potentially target people’s existing motivations surrounding climate change.

Studying motivational systems

Underlying the difficulties in conclusively demonstrating or interpreting motivational effects on judgment is the reality that goals do not describe

mutually exclusive outcomes or representations. Instead, goals constitute a hierarchical system of multiple end-states. Each goal can motivate a variety of different actions and each triggers a variety of different ongoing evaluations (see Carver & Scheier, 2001; Kruglanski et al., 2002). Two of the fundamental qualities of these larger motivational systems that goals create are *equifinality* and *multifinality* (Lewin, 1935; see Dunning, 2015). Equifinality means that any particular goal can be completed through a number of different means. For example, a desire for feeling connected to others could be achieved by interacting with friends and loved ones, recalling past satisfying interactions with others, or increasing one's sense of identification with a larger social group. In contrast, multifinality means that any particular behavior can serve to fulfill a number of different goals. For example, increasing one's sense of identification with a larger social group could serve the goal of feeling connected to others, bolstering one's sense of status and esteem, or enhancing feelings of safety from threat.

Therefore, due to multifinality, one cannot conclusively infer that the mere presence of any one judgment or action indicates the operation of a particular goal. This describes why correlations between climate beliefs and partisanship could reflect any number of goals (e.g., social consensus, value affirmation, or accuracy). Multifinality is thus the ultimate source of the observational equivalence problem in interpreting the correlations discussed earlier. Moreover, due to equifinality, one cannot conclusively infer that the adoption of any one goal will produce a particular judgment or action. One motivated by social identity could opt to adopt climate change beliefs that cohere with an important ingroup, but that person could instead think about many of his or her other policy beliefs that cohere with this ingroup. In short, simply observing specific outcomes or patterns of judgment is neither necessary nor sufficient for determining the operation of a particular motive.

Given the inherent difficulties in studying motivational systems that equifinality and multifinality create, research on motivated reasoning about climate change must advance beyond its current state. Attempting to document "partisan motives" or desires for consistency by merely making inferences from the occurrence of particular outcomes, such as the polarization of people's opinions on climate change in line with party elites, or different preferences for consuming media, is insufficient to properly establish the operation of a motivational system. Research showing that climate change beliefs correlate with presumed proxies for various types of motivations, such as strength of people's partisan identification, their knowledge, or their open mindedness (Kahan, 2015; Nisbet et al., 2013; Palm et al., 2017), also does not do enough to illustrate a motivational system. Both these types of findings provide suggestive evidence consistent with the presence of particular types of goals; however, confirming the operation of such goals requires

experimental research that manipulates motivations and then assesses whether outcomes such as the processing or acceptance of information about climate change shift in goal consistent ways (see also Kahan, 2016; Leeper & Slothuus, 2014).³ This approach may not completely solve the inferential challenges created by motivational systems, but it can provide direct evidence for the role of motivational influences. We next discuss various paradigms developed to examine motivational systems in general and offer an illustrative example of how these paradigms have been applied in a different domain to make them more concrete. We then turn to how such paradigms can be applied in the domain of climate change opinion formation.

Paradigms for illustrating motivational systems

Thankfully, because studying the influence of motivational systems on various forms of reasoning has been a key area of research in psychology for decades (see Kruglanski, 1996; Kunda, 1990), there are well-established paradigms for manipulating different goals that can readily be applied to examining climate-change opinion formation. The first is to momentarily *prime* a specific type of goal, which makes the goal temporarily accessible in working memory (Higgins, 1996). Priming methods can be performed indirectly, and even outside people's awareness, to reduce concerns about demand effects (for overviews of priming methods, see Molden, 2014a, 2014b). However, challenges include that the same priming manipulation can operate in different ways from context to context (Loersch & Payne, 2011) and may not unambiguously activate people's motivations in the desired ways. This likely contributes to some difficulties that have been identified in replicating certain types of goal priming effects (e.g., Harris et al., 2013; but see Chen et al., 2021).

Thus, another, perhaps more preferred, paradigm for temporarily manipulating specific goals involves either obstructing or satiating a goal and then examining the subsequent influence on various judgments. One defining feature of goal pursuit is that when people encounter what appear to be temporary obstacles or setbacks to their goals, they increase their goal-directed efforts to compensate; inversely, when people feel that they are performing well at a particular goal, they tend to relax their goal-directed efforts following this accomplishment (Carver & Scheier, 2001). Therefore, providing people with direct feedback that either threatens or affirms their goal progress can, respectively, activate or diminish their goal-pursuit. These methods also can be done somewhat indirectly (e.g., by providing an "unrelated activity" on which feedback can plausibly be provided before

³An alternative is to try to directly measure the goals people are currently pursuing, but this can be exceedingly difficult and, thus far, there are not clear measures in the climate change domain.

soliciting people's opinions), and have less ambiguous, and perhaps more robust, motivational effects than simply priming a goal.

A final common paradigm builds upon the idea of satiating a goal, but further exploits the principle of equifinality by examining whether feedback about fulfilling different types of goals may substitute for each another. Providing people with a sense of progress toward some goal can influence whether people subsequently pursue not only that goal itself, but also motivationally related goals (Lewin, 1935; see Dunning, 2015). Therefore, if providing a sense of accomplishment on one goal also lessens the extent to which people subsequently pursue a second goal, this indicates that the two goals have some common underlying motivations. For example, if receiving feedback that one currently enjoys high levels of social acceptance reduces the extent to which people strive to affirm or demonstrate their individual self-worth, this provides evidence that fulfilling belonging-related concerns is motivationally relevant to, and can substitute for, fulfilling esteem-related concerns (see, e.g., Knowles et al., 2010).

Investigating the substitutability of different goals also can answer questions about the overall scope of these goals. The more specific a goal is to a single context or outcome, the less likely a sense of accomplishment from potentially similar goals is to serve as an effective substitute. In contrast, the more a goal is a manifestation of some broader motivational priority, the more likely a sense of accomplishment from similar goals is to substitute for the first goal and alleviate the felt need for further pursuit (Lewin, 1935; see Dunning, 2015). For example, findings showing that feedback about social acceptance reduced people's pursuit of individual self-worth in terms of their perceived social impact, but not in terms of their intellectual accomplishments, would suggest a narrower motivational compatibility between acceptance-related and esteem-related concerns. In contrast, findings showing that feedback about social acceptance reduced pursuit of both of these aspects of self-worth would suggest a broader motivational compatibility between concerns with acceptance and esteem.⁴

⁴It is worth noting that some circumstances have been identified in which feedback about success or failure on a particular goal will not have the typical satiation versus threat effects, respectively. Satiation and threat effects arise because of the implications that the feedback people receive has for their goal progress – positive feedback illustrates progress and allows relaxation of goal pursuit whereas negative feedback illustrates a lack of progress and evokes intensification of goal pursuit (Carver & Scheier, 2001). However, at times, people may experience such feedback as providing information about their commitment to a particular goal rather than their progress toward achieving the goal (Fishbach et al., 2010). In these circumstances, positive feedback helps sustain a sense of commitment and intensifies subsequent goal pursuit whereas negative feedback undermines commitment and produces relaxation of goal pursuit. Thus, experiments focused on satiation and threat must ensure that any feedback manipulations are specifically designed to convey a sense of progress. Such dynamics further illustrate the potential complexity of motivational systems and the careful attention they must be paid when attempting to design research that provides evidence for motivated cognition.

Case study of a motivational systems approach: Self-Serving inferences

To make the above abstract overview of paradigms for studying motivational systems more concrete, consider the following example of a type of judgment long researched by psychologists. Early work on how people formed explanations for various behaviors identified a clear bias when such explanations involved their own behavior. To explain personal success, people frequently nominated causes that allowed them to claim credit, such as their own ability or effort; but, to explain personal failure, people frequently cited causes that allowed them to deflect blame, such as the inherent difficulty of the endeavor or bad luck. Early interpretations of this and related biases focused on the seemingly obvious motivational explanation that people were making self-serving judgements to manage their feelings of esteem (Bradley, 1978).

However, plausible non-motivational alternatives to this esteem account soon arose; for example, it could be that people possess vastly more information about the internal psychological contingencies of their own versus others' behaviors. This made clear that one could not infer directional motivated reasoning based just on the effects themselves (Tetlock & Levi, 1982). The solution to this particular observational equivalence problem was to directly manipulate people's feelings of esteem; researchers did this by allowing individuals to experience either success or failure at an unrelated, but personally relevant, task, such as a test of their "integrative ability," which they were told was an important component of intelligence. On a subsequent task, people who felt greater threats to esteem after they had failed at the first task would then display esteem-enhancing explanations for other positive outcomes. For example, they would describe the general qualities that predict a successful marriage largely in terms of the qualities they themselves already possessed. In contrast, people who did not feel threats to esteem after succeeding on the first task did not subsequently show such esteem-enhancing explanations. These types of results constituted clear evidence for the operation of esteem-protective motives in self-judgment (Dunning, 1999).

Beyond finding that manipulating people's current feelings of success or failure on one self-relevant task affected self-serving explanations of other outcomes, additional research also demonstrated that such manipulations affected (a) how people formed self-relevant attitudes, (b) how they searched for and evaluated new self-relevant information, and (c) how they assessed and compared themselves to others (Tesser, 2001; for a review, see Molden & Higgins, 2005). These initial experiences of success or failure were shown to motivate a broad range of other esteem-relevant behavior, which directly indicated that esteem motives are active in many different contexts and that boosting esteem through one means could substitute for the need to pursue self-serving outcomes through other means. Thus,

through the application of paradigms designed to examine specific motivational principles, the larger motivational system behind self-serving judgments could be firmly established.

This example of research establishing the role of esteem motivations plots a course for better understanding the role of motivational systems for forming climate change opinions. Although there currently appears to be some general agreement that various motivations likely influence people's climate change opinions, as noted earlier, there is not yet consensus on the nature of the broader motivational system in terms of what types of goals are actually most common when forming such opinions. There is not even agreement on whether these goals are more directional, seeking specific conclusions, or more non-directional, involving best efforts at establishing what one perceives to be the truth, nor strong evidence to support motivational claims (Druckman & McGrath, 2019; Tappin et al., 2020a, 2020b). However, adopting the types of paradigms described above to (a) conduct studies that directly activate or satisfy various types of directional goals while people are forming opinions about climate change, and (b) examine how fulfilling particular goals may broadly substitute for pursuing related goals when forming such opinions could provide a clearer picture of a motivational system on which a strong consensus can be built.

Applying motivational systems to the study of climate change beliefs

In this final section, we review some initial and ongoing efforts to begin to reveal the larger motivational system influencing people's opinions on climate change. As we discussed earlier, research on motivated reasoning involving climate change that applies a motivational systems perspective is, at present, more the exception rather than the rule. However, there are a few examples of studies that have begun to use this approach to better illustrate and define the nature of motivated reasoning on climate change.

Clarifying the influence of both directional and non-directional goals

In one study consistent with a motivational systems perspective, Bolsen et al. (2014) examined the ways in which both directional and non-directional goals can affect opinions on climate change. Participants read information about the *U.S. Energy Independence and Security Act of 2007* and were randomly assigned to also read an endorsement stating either that the Act was being supported by Democrats or that it was being supported by Republicans. Critically, participants also were randomly assigned to one of three conditions in which their goals were directly manipulated. To activate a

directional social (partisan) consensus goal, participants read that parties need to vote together to ensure coherent policy programs during a period of divided government and that they would have to later explain why they affiliate with their party. To activate a non-directional accuracy goal, participants were asked to think in an evenhanded manner and told that they would later have to justify the reasons for their judgments.⁵ In the third, control condition no additional instructions were given. After these manipulations, participants then offered their opinions about the Act. Therefore, as is important when investigating motivational systems, this study included specific manipulations of different goals to directly evaluate the effects of these goals on people's subsequent opinions (for an analogous approach involving other polarized political issues, see Groenendyk & Krupnikov, 2021).

Results showed that, in the control condition without an activated goal, people supported the climate policy more when it was endorsed by their own party than when it was endorsed by the opposing party. However, this partisan effect was even more pronounced in the directional goal conditions. In contrast, participants in the non-directional goal conditions displayed no evidence of the endorsement effect. That is, when directional social goals were activated, participants showed even more polarization toward their partisan affiliations in their attitudes on the exact same climate policy. But, when non-directional accuracy goals were activated, this polarization was eliminated, and, instead, participants appeared to evaluate the actual content of the policy, regardless of its partisan support. In addition, results indicated that both the directional and non-directional goals increased the amount of time people spent processing the information they were given about the climate policy. This result suggests that activations of different goals led people to spend a longer time processing information and they did not rely on simple heuristics, such as partisan cues. However, the opinions ultimately formed depended dramatically on the type of goal being pursued. Therefore, by adopting a motivational systems approach, this study was able to provide strong evidence for the occurrence of two different types of motivated reasoning.

Examining the influence of goal-matching in attempts to change climate beliefs

In another study that applied a motivational systems approach, Bayes et al. (2020) extend the Bolsen et al. (2014) study in several ways. First, along

⁵These specific types of manipulations combine elements of both priming and challenging the progress of people's goals. In this context, asking people to justify their affiliations or opinions implies that these will be scrutinized by a skeptical audience and activates motivations to respond to this implied challenge (see Lerner & Tetlock, 1999).

with a non-directional accuracy goal, the authors manipulated two specific directional goals that are assumed to drive climate change attitudes in much extant research (e.g., Feinberg & Willer, 2013; Fielding & Hornsey, 2016; see Table 1): upholding important ingroup values and affirming an ingroup social consensus. Second, this study investigated how such goals would influence people's response to different types of motivationally framed climate change messages.

The authors randomly assigned a representative sample of Republican participants to either a control condition (without a motivational prompt) or one of the three motivational treatment conditions. The two directional goal conditions directly threatened participants' goals by first either stating that Republicans were failing to adhere to their core conservative values (e.g., purity, decency), or that Republicans were no longer a cohesive political force. Respondents in each of these conditions were then presented agreement rating-scales that, at a minimum, left them no choice but to "somewhat agree" with the given threat (see Petrocelli et al., 2010). Thus, individuals in the values-threat condition were presumed to have a directional value-affirmation goal activated, whereas individuals in the group-consensus threat condition were presumed to have a directional social consensus seeking goal activated. The third, non-directional accuracy goal condition informed participants that they would later be asked to justify the opinions they formed, as in the previously discussed study.

Following the motivational manipulations, participants were further randomly assigned to receive one of three types of "public service announcements" exhorting action to combat climate change. First, an *informational* message described the large scientific consensus that climate change is occurring and urgently requires individual actions to mitigate it. Second, a *values-based* message framed the necessity of acting to stop climate change in terms of concerns with the sanctity of the natural world and one's patriotic duty to act – predominantly conservative moral concerns (see Graham et al., 2009). Third, a *norms-based* message described the "surprising consensus" among Republicans about the existence of climate change and their willingness to act to stop it. Therefore, for each type of manipulated goal – accuracy, value affirmation, and social consensus – there was a matching message with motivationally relevant content – informational, values-based, and ingroup-norms-based, respectively. After reading their assigned message, participants then reported their beliefs about the existence of human-induced climate change and their intentions to engage in several climate-friendly behaviors, such as recycling and driving fuel-efficient vehicles.

In summary, this study used a fully crossed design with 12 conditions; each participant received either no manipulation or one of three goal

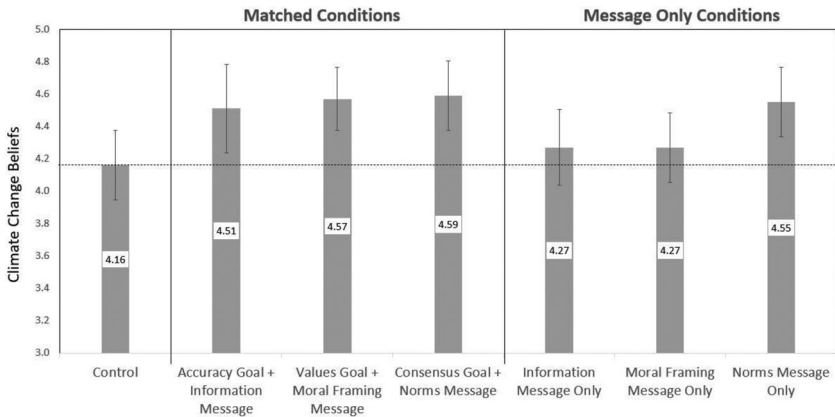


Figure 2. Climate change beliefs: matching conditions compared with control and message-only conditions.

manipulations, followed by one of three messages (there was also a thirteenth “pure control” condition with no goal manipulation and no message). Of these 12 conditions, there were three conditions of particular interest where the manipulated goal was matched with a motivationally relevant message: the accuracy goal paired with the information message, the value affirmation goal paired with the values-based message, and the social consensus goal paired with the group norms-based message.

The results of this study, as shown in [Figures 2 and 3](#), revealed clear evidence that this type of matching increased Republicans’ beliefs in climate change and intentions to adopt climate friendly behaviors, relative to the pure control baseline. In addition, there was a significant overall effect when using a focused-contrast to compare matched conditions (Panel 2 in each figure) to the conditions in which participants received a message but no motivational prime (Panel 3), indicating that matching a message to an activated motivation is more effective than disseminating it alone.⁶ Of the three messages, only the norms-based message was persuasive without an activated goal, likely because social consensus seeking was the most prominent motivation at baseline among participants who did not receive a manipulation (for further discussion, see [Bayes et al., 2020](#)).

Interestingly, additional measures on how positively participants evaluated each of the different messages they received did not show the same goal-relevance effects. This suggests that, somewhat in contrast to the [Bolsen et al. \(2014\)](#) findings, the different goals had their effects through more heuristic routes, perhaps in terms of relaxing a spontaneous partisan resistance to climate change appeals among Republicans.

⁶While the overall contrast reached conventional levels of statistical significance, not all individual contrasts did. For details, see [Bayes et al. \(2020\)](#).

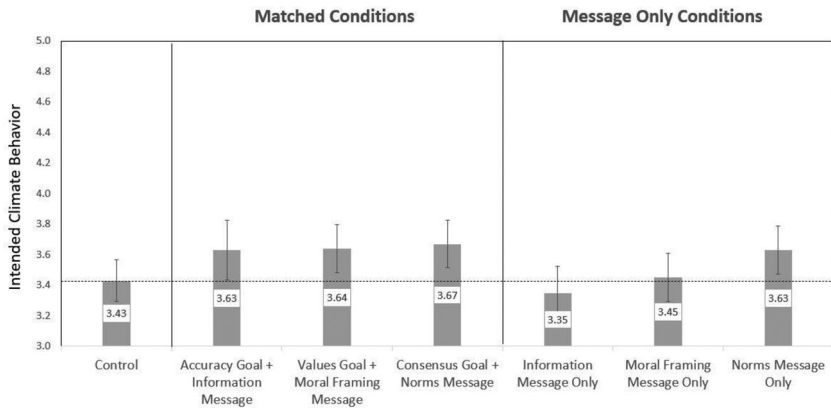


Figure 3. Climate change intended behaviors: matching conditions compared with control and message-only conditions.

To provide additional evidence that matched pairings of goals and messages are distinctly influential, another focused-contrast compared the matched conditions to the conditions in which there was a *mismatch* between the activated goal and the message. Results of this contrast also showed a significant overall effect, indicating that a message is more effective when matched to an activated goal than when it is motivationally irrelevant.⁷ (These results are available in Bayes et al., 2020; we do not present them here.)

On the whole, the Bayes et al. (2020) study directly shows that when different goals are activated, people specifically respond to goal relevant information. Importantly, in their study, no single goal or message uniformly influenced Republicans' responses across all conditions; motivated reasoning occurred only when the messages received matched the activated goals. Thus, not only did this study apply a motivational systems approach to provide evidence for motivated reasoning effects, it also illustrated how this approach can be potentially applied to change people's opinions about climate change, at least temporarily. Finally, it should be noted that, although the findings of this study demonstrated that both directional and non-directional motivated reasoning can potentially be harnessed for opinion change even among climate change skeptics, such effects are nuanced and potentially complex. Indeed, consistent with the inherent challenge of multifinality within motivational systems discussed earlier, the apparent mechanism for goal-directed opinion change in this study differed from the mechanism for goal-directed evaluation of the climate change policy in

⁷Once again, while the overall contrast reached conventional levels of statistical significance, not all individual contrasts did. For details, see Bayes et al. (2020).

Bolsen et al. (2014), illustrating how similar goals activated in this context can be achieved by different means.

Investigating substitutability to understand and reduce climate change skepticism

The two studies reviewed in this section represent examples of how our proposed motivational systems approach can substantially advance the investigation of motivated reasoning in people's opinions about climate change. However, these are certainly not the only possible applications of such an approach. Additional research that we are currently planning aims to utilize the logic of substitutability to examine what types of goals lie at the core of skeptics' denial of climate change and how these goals might be harnessed to reduce skepticism. If at least some portion of skeptics' denial of climate change arises from motivated reasoning, then providing these skeptics with some alternative means to fulfill the broader goals driving such reasoning could perhaps reduce denial. The study we have designed examines the two facets of social consensus goals outlined above that Republicans' disbelief in climate change may serve to fulfill: a desire to seek informational value in the consensus opinions of a respected in-group (i.e., an *informational* goal), and a desire to feel socially connected to and identified with their partisan in-group (i.e., an *affiliation* goal).

We plan to randomly assign Republican participants to treatments that either separately threaten or satisfy each of these two potentially distinct aspects of social consensus goals. Everyone will complete initial measures of their political opinions on various issues and their general scientific knowledge. No matter their actual responses to these measures, participants in the two threat conditions will then learn that their responses put them either outside the party norm on their political opinions in the affiliation goal condition or indicate low scientific knowledge compared to other Republicans in the informational goal condition. Participants in the two satisfaction conditions will learn that their responses put them well within the party norm on their opinions in the affirmation goal condition or indicate high scientific knowledge in the information goal condition. Thus, a threat that their opinions either do not cohere with the consensus of their group, or that their knowledge is less than their group members, should make participants want to reassert their group connections for either social connection or social consensus information, respectively. In contrast, satisfying concerns about their current status within the group, or their need to rely on their group as a valid source of information (because their personal knowledge is likely to be superior), should "free" participants from having to conform to group opinions in either case.

After these activation exercises, everyone will read a brief summary of the scientific evidence supporting human-induced climate change. They then will answer questions about their belief in climate change. To the extent that either affiliation or informational goals are influencing climate change skepticism, then feedback threatening one's completion of either goal should magnify skepticism and reduce beliefs in climate change. Yet, feedback satisfying the completion of either goal should reduce skepticism and increase beliefs in climate change as compared to a no-feedback control group. This would indicate that the goal activation exercise satisfied either social consensus goal and thus served as a substitute for pursuing these goals in a way that allowed participants to focus on the information and put directional social goals aside. That is, to further elaborate on the logic of the motivational systems approach in this instance, if people engage in climate skepticism as part of a goal to feel like a valued member of their group (Kahan, 2015), then they should engage in more skepticism when they are more worried about how they fit in with the group. They should exhibit less skepticism when they feel secure that they fit in with the group. Similarly, if people engage in climate skepticism as part of a goal to derive information from the consensus of a trusted in-group, then they should engage in more skepticism when they doubt their own personal expertise in that area relative to their group, and less skepticism when they perceive their personal expertise to exceed the group's.

The logic of a motivational systems approach also suggests that the larger the relative effects of threat and satisfaction in either the affiliation or the informational goal condition, the more that goal is substitutable with the primary motivations that might lay behind people's skepticism. Thus, this proposed study utilizes such an approach in an attempt to not only examine the presence of different types of motivated reasoning in how people respond to scientific information about climate change, but also to begin to investigate the relative importance of these different varieties of social consensus motivations for climate change skepticism itself. The results could help begin to clarify the extent to which the frequently observed social influence of perceived political party consensus about climate change on people's judgments is primarily due to either directional affiliation-goals or directional informational-goals or some combination of both. Such valuable insights would not be possible without utilizing a motivational system analysis.

Future work could even further exploit substitutability paradigms to more fully understand what fundamentally drives climate change skepticism. Rather than simply comparing different aspects of social consensus goals, additional experiments could begin to compare broader classes of goals. That is, by threatening and satisfying goals that could represent

more general motives underlying climate change skepticism, such as establishing (a) basic feelings of social connection in general, (b) perceptions of control over one's own outcomes, or (c) global feelings of safety and security, one could assess how large a role each of these might play (if any) in people's climate change opinions. If these types of manipulations produce notable effects, this would provide strong evidence for the relevance of such broader motivations for climate change opinions and extend the understanding of motivated climate skepticism beyond narrower goals involving political partisanship.

Depending upon the results of these types of studies, future work could also attempt to develop more practical and scalable messaging strategies that exploit motivational matching effects. Analogous to the research on message framing and changing health-related behaviors (e.g., Gallagher & Updegraff, 2012), it could be possible to create messages that both evoke particular motivations regarding the issue of climate change and then advocate for actions that address these motivations. For example, brief communications that (a) directly challenge people's personal support for specific climate friendly behaviors, (b) report a broad social consensus for the importance of those behaviors, and (c) advocate increased action consistent with those behaviors could potentially create a motivational system that would make such a communication more effective than any of its component parts alone. Attempting to develop such methods is an important direction for future research.

Conclusion

Although much research has sought to demonstrate and understand the role of motivated reasoning in people's opinions about climate change, the existing evidence for this type of reasoning is more heterogeneous and less robust than often portrayed. Many studies present results consistent with particular types of motivated reasoning, but the evidence is, at best, suggestive of motivational influences and ambiguous with regard to what types of goals actually drive people's judgments. To strengthen research in this area, we therefore outline what we term a motivational systems approach designed to more directly establish the effects of different types of goals on the climate change beliefs that people adopt.

This motivational systems approach is designed to, as much as is possible, address the inherent challenges of studying any type of motivational effect on judgment. Because goals are equifinal, in that one can accomplish them through a variety of specific actions, and actions are multifinal, in that each action may serve a variety of different goals, the clear inferences one can draw from merely observing the prevalence of particular judgments in different

circumstances are severely limited. Demonstrating goal-directed opinion formation thus requires direct manipulations that prime, threaten, or satisfy a specific goal and then produce subsequent changes in such opinions. Fortunately, researchers have established several types of paradigms that illustrate how to develop such manipulations, and even how to further extend the principles of motivational systems to answer broader questions about the scope and overlap of different types of goals that may drive motivated reasoning. Although the complexities of motivational systems can go well beyond the relatively simple principles highlighted here (see e.g., Kruglanski et al., 2012), we offer these principles as an important foundation on which future research on motivated thinking about climate change can build.

Studies are just beginning to adopt a motivational systems approach to investigate climate change beliefs, but there are several existing examples that highlight the benefits of this approach. Direct manipulations of both people's directional and non-directional goals prior to providing information about climate change show that both of these types of goals can affect people's evaluations of this information. Moreover, these types of manipulations have also begun to reveal the different types of mechanisms through which such effects occur, including changes in people's engagement with and acceptance of the climate change information they receive. Although much work still remains to determine the ultimate utility of our motivational systems approach, there are a variety of exciting and important questions that it can potentially answer and that we are actively pursuing. To understand when and how people engage in motivated reasoning about climate change, and what might be done to alter such reasoning, one must ultimately ask questions about why these motivations are activated at all. The motivational systems perspective developed here not only highlights the importance of asking this question, but also provides a practical strategy for attempting to answer it.

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