Focus Article

Public engagement with climate change: the role of human values

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A long history of interdisciplinary research highlights the powerful role that human values play in shaping individuals' engagement with environmental issues. That certain values are supportive of proenvironmental orientation and behavior is now well established. But as the challenge of communicating the risks of climate change has grown increasingly urgent, there has been a rise in interest around how values shape public engagement with this issue. In this paper, we review the growing body of work that explores the role of human values (and the closely related concept of cultural worldviews) in public engagement with climate change. Following a brief conceptual overview of values and their relationship to environmental engagement in general, we then provide a review of the literature linking value-orientations and engagement with climate change. We also review both academic and 'gray' literature from civil society organizations that has focused on how public messages about climate change should be framed, and discuss the significance of research on human values for climate change communication strategies.

How to cite this article:
WIREs Clim Change 2014. doi: 10.1002/wcc.269

INTRODUCTION

As the risks posed by anthropogenic climate change have become increasingly well documented,[1] the urgency of engaging the public around these risks has grown.[2–5] Research has focused on a wide variety of topics, including the congruence between proenvironmental attitudes and behavior[6]; the ideological determinants of climate change risk perceptions[7]; the social factors affecting the performance of low-carbon behaviors[8]; the many situational influences on beliefs about climate change and how to mitigate it[9]; and, of course, human values. However, despite several significant overviews and summaries of research on public engagement with climate change,[3,4,10–12] there has been no systematic review of the role of human values in shaping public engagement with climate change. This is surprising, given the recent rise in interest around this issue.[13–17] The renewed interest has been driven by a seemingly simple question: are there certain values on which public engagement with climate change is (or should be) predicated?

In this paper, we attempt to answer this question by reviewing the empirical literature on human values and public engagement with climate change. In the first section, we identify a variety of ways in which values have been conceptualized, and briefly describe how values are related to general environmental attitudes and behaviors. Next, we review the literature on the role of values in public engagement with climate change specifically. We also review both academic and 'gray' literature from civil society organizations that has focused on how public messages about climate change should be framed (including closely related research on cultural worldviews and risk perception,[18] and finally, highlight the significance and implications of research on human values for improving the effectiveness of communication strategies.

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Conflict• of interest: The authors have declared no conflicts of interest for this article.

VALUES AND THE ENVIRONMENT

There is a large body of literature, stretching back at least three decades and encompassing disciplines including economics, anthropology, sociology, philosophy, and psychology, that has sought to understand and explain the relationship between people's values and how they engage with the natural environment. Inevitably, the approaches taken by scholars from these different disciplines have emphasized multiple theoretical and conceptual frameworks, some of which we explore below. It is critical to draw a distinction at the outset, however, between 'human values' and the economic concept of 'valuation'.

The idea of valuation derives from economic and decision theory and equates an individual's values with preferences that are either 'revealed' by direct observation of what market actors choose or do, or 'stated' in surveys of what people say they prefer—thereby providing a direct measure of value.[19] For many issues concerning the environment a series of fundamental objections have been raised to this market-based approach to measuring values,[20–22] and while the economic preference approach is undoubtedly useful for informing some difficult health and environmental policy decisions,[23] it avoids the theoretical question of *why things should be as they are* for people beyond the operation of individual or collective choices, making it less useful for understanding the relationship between people's underlying values and issues such as climate change. In the remainder of the paper, therefore, we exclude this economic notion of value from further discussion and analysis.

The first attempt to systematically define and measure values was the seminal work of Rokeach,[24,25] who described both 'terminal' (that is, desirable end states of existence) and 'instrumental' (that is, preferable modes of behavior) values. However, a value is usually defined by social psychologists as a 'guiding principle in the life of a person', following the description employed by Shalom Schwartz and his colleagues in a major program of theoretical and empirical research (drawing on Rokeach's terminal values in particular) that spanned several decades, 44 nations and over 25,000 respondents.[24,26,27] In contrast to the economic concept of valuation, human values are assumed to be relatively stable dimensions of individuals' personalities and behavior, rather than transient preferences (although they may shift over individuals' lifespans[28]; or indeed generationally in response to socio-cultural changes[29]).

Schwartz identified 56 'universal' values that can be divided into four distinct clusters which vary along two basic dimensions. These two dimensions are openness to change (including self-direction and stimulation) versus a desire to conserve/respect tradition (including security and conformity); and self-transcendence (including altruism, forgiveness, and loyalty) versus self-enhancement (including power, ambition and hedonism). Although people possess a range of different and sometimes conflicting values, those who identify strongly with self-enhancing values (e.g. materialism, personal ambition) tend not to identify strongly with self-transcending values (e.g. benevolence, respect for the environment), and vice-versa.[26] Subsequent work drawing directly on Schwartz's inventory has refined and shortened the 56 item scale,[30] but the core distinction between self-transcendent and self-enhancing value orientations has continued to play an important role in values research to this day (including, as we shall describe in the next section, public engagement with climate change).

However, although the Schwartz conceptualisation of values is now dominant in social psychology, other researchers have taken values theorizing and measurement in slightly different directions. DeGroot and Steg[31] divided the same initial inventory into three broad clusters of values: egoistic (i.e. self-focused), biospheric (i.e. environmentally focused) and altruistic (i.e. others-focused; see also Ref 30). Other scholars have posited an alternative set of items that capture the closely related concepts of ecocentrism and anthropocentricism,[32] or introduced a distinction between 'intrinsic' and 'extrinsic' motivations.[33] Inglehart focused on Rockeach's instrumental rather than terminal values,[29,34] describing a set of 'post-materialist' values that have emerged in industrialized economies which have experienced growing affluence and economic/political security. Other sociological treatments—often distinct from the empirical work described above—have tended to focus on the idea that values are a latent means of evaluating the social world[35,36] which are explicitly motivational (in that they help to privilege certain actions or outcomes[37]).

A focus on altruism is a reoccurring theme across many of the different social–psychological and sociological approaches to values.[38–40] Altruistic and biospheric values are sometimes considered to be broadly equivalent to Schwartz's self-transcendent and conservation groupings, while egoistic values appear to fit within the self-enhancement cluster. However, despite some clear parallels between these groupings, these classification structures do not map precisely on to each other, and they frequently co-exist in the literature.

An alternative conception derives from anthropology, and more specifically Douglas and

Wildavsky's cultural theory of risk.[41] According to this approach, values (more commonly called cultural worldviews) exist on two cross-cutting dimensions and describe people's orientation towards different societal arrangements. The first, 'hierarchy-egalitarianism,' refers to a cultural preference for an equitable division of resources (i.e. irrespective of gender, race or religion). The second, 'individualism-communitarianism,' relates to the question of whether individual interests should be subordinated to collective ones.

Within philosophy, values are typically considered to be a form of *ethics*—that is, an abstract set of moral principles which when reflected on allow us to arbitrate between situational preferences which might otherwise compete.[42,43] This philosophical conception of values (although at odds with the psychological assumption that values are latent or not consciously considered) has an intuitive resonance in everyday discourse. Finally, it is possible to consider values through the lens of formal political ideology.[33,44] There is no straightforward way of reconciling the multiple conceptions of human values that exist across these multiple literatures, as they draw on different intellectual traditions and make different assumptions about human behavior and its drivers. Previous reviews[37,39] have more comprehensively delineated the strands of scholarship that we briefly describe here. However, a common interest among scholars utilizing divergent theories of human values is the question of how they relate to people's engagement with environmental risks.[1] And here, these conceptually disparate approaches converge on some well-established conclusions—specifically, that certain types of values are predictive of positive engagement with environmental issues, while others are not.

Values are generally considered to be *indirectly* related to proenvironmental behavior, albeit as part of a causal cognitive chain that includes domain-specific beliefs, particular behavioral norms, and stated intentions.[6] They may often only account for a small fraction of the variation observed in any given proenvironmental behavior.[45,46] Nevertheless, there are some consistent patterns of relation between the values that people hold and their engagement with environmental issues. In particular, people who endorse self-transcendent values (especially proenvironmental or biospheric values, and high levels of altruism) are more likely to engage in sustainable behavior,[31,47–51] show higher concern about environmental risks,[52] are more likely to perform specific actions such as recycling,[53] are more likely to engage in indirect and direct political engagement on environmental issues[49,54] and, as we will discuss in detail in the next section, are more likely to engage positively with climate change. Different cultural worldviews have also been consistently associated with environmental risk perceptions: the more people endorse hierarchical and individualistic worldviews, the more they are likely to downplay environmental risks.[55–57]

Given that the personal values that individuals hold are central determinants of environmental risk perceptions, and that climate change is in many ways simply a specific instantiation of the category 'environmental risk,'[39] it is perhaps unsurprising that values should also play a central role in determining public engagement with climate change. In fact, it is difficult to draw a precise distinction between research that examines the link between values and general proenvironmental engagement (e.g. energy-saving regardless of motivation, involvement in an antilittering initiative, or taking part in a campaign to protect forest land) and research linking values and engagement with climate change specifically (although see 49 for a useful delineation of different forms of environmental engagement and proenvironmental behavior). However, following Lorenzoni et al.[2] (as well as most other literature in this area), we limit our review in the following section to studies that examine the link between values and *intentional* public engagement with climate change rather than environmental attitudes or behaviors in general (i.e. proenvironmental behavior regardless of the motivation).

VALUES AND PUBLIC ENGAGEMENT WITH CLIMATE CHANGE

Although there is a great deal of literature on public perceptions of climate change that predates it, the first publication to explicitly examine the relationship between values and beliefs about climate change focused on predicting acceptance of policy measures aimed at mitigating climate change.[58] The study found that willingness to accept policy measures was positively related to self-transcendent values. At around the same time, and also focusing on willingness to support specific policy prescriptions for climate change mitigation, Dietz et al.[59] reported that altruism (a self-transcendent value) was positively (although indirectly) associated with policy support (the effect was mediated by environmental attitudes). Subsequent research conducted since these initial studies has confirmed that people who endorse biospheric and altruistic (i.e., self-transcendent) values are more likely to report concern about the risks and consequences of climate change[60,61] and are less likely to be skeptical

about the reality or seriousness of the problem.[62] In a qualitative study exploring in detail the attitudes and values of a small group of individuals who had made significant behavioral adjustments to their lifestyles in response to climate change,[16] concerns relating to biospheric values were found to be secondary to altruistic ones as motivations of behavior. Although concern about 'the environment' for its own sake motivated some people in the study, more dominant was the perceived social injustice that climate change would bring.

Beyond the now well-established cluster of self-transcendent values that predict positive views towards climate change, reflecting the relationship between self-transcendent values and environmental beliefs in general, Dietz et al.[59] found a weaker (but still significant) relationship between the endorsement of certain traditional values (such as honoring one's parents, or showing respect) and willingness to support climate change policies. However, the relationship between 'traditional' values such as these and engagement with climate change is ambiguous—other studies have linked the endorsement of traditional values such as conformity and security to higher levels of skepticism about the reality or seriousness of climate change.[32] This ambiguous relationship between traditional values and engagement with climate change is likely to provide one of the explanations for the consistent association between climate change skepticism and political conservatism.[48,62,63] Although there is no unitary form of political conservatism—especially when considered across different nations—it tends to incorporate a respect for tradition.

In fact, differences in levels of climate change engagement across societal groups defined by their political ideology or cultural worldviews[41] have been documented by multiple researchers over the past decade,[64,65] with some of these differences appearing to have grown in recent years.[65] In a recent series of studies, individuals with stronger egalitarian and communitarian worldviews were found to perceive climate change as riskier than those with individualistic and hierarchical values.[55–57] Egalitarian–communitarians also perceived a more urgent need for ameliorative action and were more supportive of climate policies that restrained market freedom (e.g. regulation of industry). In contrast, individualistic and hierarchical individuals tended to be more supportive of climate policies that maintain the autonomy of the free market (e.g. enhanced nuclear power capacity or geoengineering[55]).

Similarly, McCright and Dunlap[63] demonstrated significant differences between US citizens who self-identified as Republicans and Democrats with respect to basic beliefs about climate change (i.e. whether it is happening), risk perceptions and willingness to take ameliorative action or support mitigation policy. There is an important question, therefore, regarding the conceptual overlap (and by extension unique contribution) of cultural worldview measures vis-à-vis partisan ideology (and indeed value orientations[64,65]). However, resolving this issue is beyond the scope of this review.

These findings appear to provide strong evidence in favor of the 'interpretative' effects of values on climate engagement: the values we hold influence how we interpret the information we are exposed to about climate change in ways that lead us to either accept or reject the need for greater engagement and action. Leiserowitz and his colleagues have taken this argument a step further, identifying six 'interpretive communities' within the United States which reflect varying levels of belief in and engagement with climate change (from the most engaged 'Alarmed' group to the most skeptical 'Dismissive' group[66]). Moreover, because political ideology is closely related to the values and worldviews that people hold, these and other effects point to the important role that values play in driving much of the political and cultural polarization observed in the climate change domain.

One way that values and worldviews shape climate engagement (and partisan polarization) is by acting as filters on the interpretation of the information to which individuals are exposed about climate change. Utilizing a modified version of Schwartz' norm-activation model, Stern et al.[67] argued that beliefs about 'emergent attitude objects' (e.g. a new environmental issue such as climate change) are often developed in response to individuals asking themselves, 'What are the implications of this object for the thing I value most?' (p. 1615). Thus, specific beliefs or feelings about climate change are derived from initial perceptions people form regarding the implications that climate change is perceived to hold for the values that they strongly endorse, which is to say, 'for people like them'[68,69]; these initial and often rapid perceptions in turn powerfully shape engagement and policy support.[70–72]

All of this suggests that the extent to which climate change can be made to seem congruent with an individual's or group's values is likely to determine the effectiveness of communication strategies. In the next section, we review work asking how messages about climate change should be framed for effective public engagement.

VALUES AND THE FRAMING OF CAMPAIGNS ABOUT CLIMATE CHANGE

All information is 'framed' by the context in which it appears[73]; such framing can be either intentional or unintentional on the part of the communicator. For example, putting a financial value on an endangered species, and building an economic case for their conservation 'commodifies' them, and makes them equivalent (at the level of the frame used to communicate about them) to other assets of the same value (like a hotel chain[13]). This is a very different frame to one that attempts to achieve the same conservation goals through, for example, emphasizing the intrinsic value of a rare animal species—that is, as something that should be protected in its own right.

As the previous section demonstrates, there has been a rise in academic interest in how value orientations shape engagement with climate change. However, there has been perhaps even greater interest among practitioners of climate change communication—that is, nongovernmental organizations (NGOs), civil society groups and government officials—eager to understand how to more effectively engage the public on this issue. Values are relatively stable across the adult lifespan, and so are unlikely to be changed by message-based campaigns to promote public engagement with climate change in the short-term ([74], although as we discuss in the final section, more deliberative processes may engage and even alter values over time[75]). Reflecting this, there have been two primary trends in values-based climate change campaigning over the past few years: firstly, to promote messages primarily oriented towards self-transcendent values (which are likely to resonate with the membership of environmental organizations, but may not have broader cultural transfer); and secondly, to identify the values that target populations actually hold (whatever they are—even if they include values known to be incongruent with environmental engagement, such as materialism) and try to match campaign messages to those values (a strategy known as 'social marketing'[76]). We discuss each of these strategies in turn.

Driven by the priorities and principles of large environmental organizations like Greenpeace and Friends of the Earth, a great deal of initial public messaging tended to highlight biospheric or self-transcendent aspects of the challenge of climate change. Images of stranded polar bears, rhetoric about 'saving the planet' and guilt or fear-based messaging around consumption have all been popular strategies.[77] This approach clearly frames the problem as an issue of social justice, animal welfare, or inequality of consumption. Framing the issue in these terms, while factually accurate, has worked to associate climate change with certain cultural values (e.g. self-transcendence, altruism) while ignoring or explicitly denigrating others (e.g. materialism or hedonism). One unintended result of this is that public engagement with climate change has become polarized along values-based lines: individuals and groups that tend to strongly endorse self-transcendent values have come to view climate change as a serious problem requiring immediate ameliorative action, while those who more strongly endorse self-enhancement values have come to view action on climate change as an (implicit) attack on their values, and something that should only be pursued if it is in their individual self-interest.[56,58]

In response to the growing realization among campaigners and practitioners that such climate change messages have not effectively reached large swaths of the general public (across nations), there has been a more recent trend for environmental NGOs, as well as governmental actors, to adopt the principles of social marketing—that is, the systematic application of concepts and strategies used to market physical products in order to achieve prosocial behavioral goals.[78] Central among these principles is the idea that the audience of a campaign should be 'segmented' into different groups based on differences in their attitudes or values, and that the message of the campaign should be tailored to these different groups. The techniques and strategies of social marketing have been shown to be successful in promoting some limited changes in proenvironmental behaviors, and have been pursued by a wide range of actors seeking to engage the pubic on climate change.[79] However, because social marketing advocates frame messages about climate change according to the dominant values of the target audience, such efforts can lead to paradoxical situations whereby values known to be incongruent with engagement with climate change (e.g. materialism) are used as the basis of campaigns to engage the public.[80] In particular, it has become very common for campaigns aimed at promoting climate-friendly behavior to emphasize the economic benefits of doing so, rather than the environmental ones.[81]

Highlighting the central role of human values in the debate about how best to engage the public around climate change, a series of publications associated with the environmental campaigner Tom Crompton have challenged the legitimacy of the social marketing approach.[13,81,82] The central argument of Crompton and his colleagues' work is that given the

negative relationship between self-enhancing values and engagement with environmental issues, these sorts of campaigns—although potentially effective for producing small scale, piecemeal and short-term behavioral changes—undermine the 'common cause' on which all campaigns on 'bigger than self' issues like climate change ultimately depend, namely, the activation of self-transcendent values in the general population.[13,83]

One testable hypothesis arising from Crompton's body of work is that focusing on self-enhancing values will make behavioral 'spillover'—that is, the transference of positive engagement with climate change from one behavior to another—less likely (because the original behavior was only performed for economic gain, not out of environmental concern[82]). Evans et al.[15] provided the first direct empirical test of this 'spillover' hypothesis for proenvironmental behavior, priming participants with either environmental, financial or a combination of both types of reasons as motivation for car-sharing, and then measuring the level of subsequent energy-saving actions participants engaged in. Participants that had been primed with environmental reasons for car-sharing were more likely to recycle their materials at the end of the experiment than participants who had been primed with either financial, or a mixture of financial and environmental reasons for car sharing.

The values embedded in messages about climate change have also become a focus of research that has sought to understand how to overcome partisan and other divides on climate change. Several studies with US citizens have suggested that reframing climate change as a public health problem—for example because of declining air and water quality—might be an effective way of reaching audiences who would normally avoid or even dismiss the issue.[84] One recent study found that simply labeling energy efficient lightbulbs with an environmental message was sufficient to reduce purchasing rates.[85] Another study found that conservatives were more favorable towards environmental messages when these focused on pollution, and the 'purity' of the natural environment, rather than the more conventional set of arguments about a moral responsibility to avoid harm.[86]

Similarly, a recent report for the Climate Outreach and Information Network[87] argued for the importance of identifying the overlap between the values underpinning British political conservatism and those which are congruent with sustainability, such as an emphasis on community well-being, intergenerational duty and a representation of the environment not as a 'service provider' but as something that people have a duty to protect. And in one recent small-scale study of Conservative voters in the UK, messages about low-carbon transport policies produced lower levels of fatalism and a greater sense of responsibility when they were framed using self-transcending (rather than self-enhancing) conservative values such as the beauty of local landscapes.[88] Reflecting some of the findings above, deliberative and survey work for the UK Energy Research Centre[89] has also revealed a core set of values that people wish to see reflected in any future energy system designed to meet the challenges of climate change and energy security (including protection of nature, fairness and respect for the autonomy of individuals, and a positive contribution to future well-being as well as efficiency, the avoidance of waste, and long term thinking).

We have described the two dominant approaches to values-based communication of climate change over the past decade. The key insight of the social marketing approach is to tailor the content of a campaign to the values of the target audience—no matter what they are. However, the empirical evidence shows that self-transcendent values are congruent (and self-enhancing values incongruent) with positive engagement with climate change. On the face of it, these two conclusions are difficult to reconcile. However, although value-based differences between individuals and groups exert an important influence over the effectiveness of climate change communication, very few individuals hold only one set of values entirely at the expense of the other—and even individuals who score highly on measures of materialism have been shown to identify with and be receptive to messages framed using self-transcendent values (at least, under certain conditions[90]). Critical, therefore, is the extent to which particular values are activated and primed by communications.[47,83,91]

The challenge for climate change communicators seeking to make the most effective use of research on human values is to identify ways of bridging between the diverse values that any given group of individuals holds and values that are congruent with a more sustainable society. Coupling, for example, values around security or freedom with self-transcending values like concern for the welfare of others is one possible way of resolving the tension between the social marketing and 'common cause' approaches to campaigning, and making best use of the available academic evidence.[92,93] In addition, it is now well established that communication strategies based on 'one way' message-oriented communication tend to be ineffective at fostering significant and sustained behavioral engagement[76,94,95] They may also promote polarized views through 'biased

assimilation' of the message content by opposing attitudinal groups.[96]

The habits and social practices of individuals and groups provide the context in which value-based messages are received, yet the vast majority of public communication around climate change has involved individuals, and not much consideration of the social context.[97,98] It follows, therefore, that if attempts to engage the public more effectively on climate change are to utilize insights from research on human values, these insights would be best applied in more participatory, group level, situations.[88] In fact, there is evidence that deliberative processes themselves promote more altruistic evaluations of environmental issues like climate change.[75,99–101]

CONCLUSION

Despite the relatively short space of time in which climate change has occupied a prominent place in public and policy discourse, a substantial literature focusing on the role played by human values in determining public engagement with climate change has quickly emerged. The contribution of the current paper has been to provide the first review of this literature, as well as discussing a number of important practical implications for campaigns and initiatives seeking to engage the public around climate change.

Although there are multiple overlapping (and sometimes competing) theoretical definitions of what values are, and how they can be measured, a relatively clear message arises from this literature: there are certain clusters of values which are strongly predictive of positive engagement with climate change (in particular, self-transcendent/altruistic values), and others (self-enhancing values) that appear less congruent with sustained, long-term engagement. This conclusion is to be expected given the significant body of previous work that has shown a link between these types of values and engagement with environmental risks in general. But this review also points to some issues that are particular to public engagement with climate change.

Firstly, the degree of political polarization that has developed around climate change (in some Western countries, at least) reflects the fact that disagreements about climate change are more likely to be about values than about the underlying science—even though the science is often used as a proxy for these values-based disputes.[102] Although values are fairly abstract concepts, one way in which they are instantiated is through formal political ideologies, which are likely to be more or less favorable to particular climate policies. Thus, a great deal of research has focused on understanding patterns of public perceptions derived primarily from values-based differences in political judgments about climate policies. Secondly, nonacademic 'gray' literature from civil society organizations has played a central role in the debate about how human values shape public engagement with climate change. Practitioner-led debates about how to use the findings of academic research on values in messages aimed at engaging the public on climate change have in turn led to increased interest among academics in the subject. And finally, research has started to move beyond simply documenting how values correspond with attitudinal variables such as levels of concern about climate change, and to adopt more explicitly normative goals, such as investigating how messages about climate change might be framed to appeal to citizens who do not identify with traditionally 'proenvironmental' ideas, or how more substantive behavioral engagement can be promoted among the general public.

The role of human values in public engagement with climate change presents a unique window on the subtle and reciprocal relationship between academic research and the societal problems it is often designed to address: the normative concerns and aims of campaigners have fed directly into academic research, which has in turn elucidated the sorts of values that a more sustainable society might be grounded in. Given the continuing urgency of developing a society-wide response to climate change , it seems likely that the trajectory of research in this field will continue in this direction—at the interface between primary research and practical problem solving (•Boxes 1 and 2).

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BOX 1

THE ROLE OF VALUES IN PUBLIC ENGAGEMENT WITH CLIMATE CHANGE: HOW FAR DOES THE RESEARCH GENERALIZE?

Research on international public perceptions of climate change is now starting to proliferate,[103] but there is only a limited amount of research examining the role of values in public engagement with climate change in non-Western nations. At a general level, concern about climate change is highest in nations (e.g. Brazil, Bangladesh) that are likely to be most vulnerable to its impacts.[103] Many non-Western nations are more collectivist (and less individually-oriented) in terms of their culture,[104] and so the tension between proenvironmental messages and

individualism may be less apparent than in strongly individualist nations like the United States.[105] Several reports on public engagement with climate change in African countries like Uganda have pointed to the importance of communicating climate change in ways that resonate with religious or indigenous values and beliefs,[106,107] while an analysis of a large sample of the Indian population used ratings of egalitarian and individualistic value-statements as one criteria for identifying six distinct interpretative communities for climate change communication (mirroring similar work with the US public[108]).

Although different contemporary cultures may rank the relative importance of various values differently, the structure of values has been shown empirically to be nearly universal.[26,39] There is no reason to assume that a similar relationship between self-transcendent/self-enhancing values and engagement with climate change would not be found in non-Western cultures. Clearly, however, this is an important area for further research.

BOX 2

THE ROLE OF VALUES IN ADAPTATION

In the same way that values play an important role in how people view the risks and consequences of climate change,[62,63] the effects of climate change are likely to have profound impacts on cultural and personal values[109] and people's views about adaptation.[110] A growing body of literature has begun to argue that climate change risk assessments—and recommendations about adaptation—must pay more attention to social valuations as well as economic ones if policies are to be effective.[109] An analysis by O'Brien and Wolf[111] focused specifically on the potential for conflict if certain values are prioritized over others in adaptation policies (e.g. through techno-centric rather than more socially grounded responses). The acceptability of adaptation policies hinges crucially on what people consider to be worth preserving or achieving through adaptation policies—that is, the things that they value.

For example, drawing on interviews with two remote communities in subarctic Canada, Wolf et al.[112] showed that values such as tradition, freedom, harmony and safety affected individual interpretations of climate impacts, and led to distinct views on how to adapt to them. Graham et al.[113] analyzed the 'lived values' (including health, safety and belongingness) that would be threatened in communities at risk from sea-level rise. The authors argued that these social values are as much at risk from sea-level rise as physical commodities like land or property, and that they are likely to be critical in determining public perceptions of how to respond to climate impacts.

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