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Moral reasoning in adaptation to climate change

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ABSTRACT

Moral foundations theory argues that moral reasoning is widely observed and fundamental to the legitimacy of relevant governance and policy interventions. A new analytical framework to examine and test how moral reasoning underpins and legitimizes governance and practice on adaptation to climate change risks is proposed. It develops a typology of eight categories of vulnerability-based and system-based moral reasoning that pertain to the dilemmas around adaptation and examines the prevalence of these moral categories in public discourse about specific adaptation issues. The framework is tested using data on climate change impact, adaptation, and societal responsibility, drawn from 14 focus groups comprising 148 participants across the UK. Participants consistently use moral reasoning to explain their views on climate adaptation; these include both vulnerability-based and system-based framings. These findings explain public responses to adaptation options and governance, and have implications for the direction of adaptation policy, including understanding which types of reasoning support politically legitimate interventions.

KEYWORDS Climate change adaptation; moral reasoning; moral foundations; focus groups; climate justice

Introduction

Adaptation to the impacts of climate change throws up multiple social dilemmas that involve moral and justice issues. These include: who gains and who benefits from adaptation strategies, trade-offs between mitigation and adaptation, and the legitimacy of collective and governance responses. Much research and public discourse that addresses questions about justice and morality, however, overwhelmingly focus on responsibilities for sharing of efforts on mitigation of greenhouse gases. There are diverse ways to analyze alternative conceptualizations of climate justice, and indeed of explaining the dominance of particular issues (e.g. Vanderheiden 2011, Grasso 2013). At the heart of climate justice is recognition that human-induced climate change involves the imposition of unforeseen and unknown consequences on present and future societies. Hence, the dominant normative discourse of climate justice tends to focus on reducing

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the causes of climate change and not imposing harms associated with its impacts, rather than addressing the concerns relevant to adaptation.

At the same time, a number of more specific moral or ethical issues have been raised about the governance of adaptation, such as those of representation and giving voice for vulnerable and marginalized populations, and representation of nonhuman nature (Adger *et al.* 2011; Adger and Nicholson-Cole 2011, Hale *et al.* 2013, Eriksen *et al.* 2015). The analysis here therefore seeks to expand the scope of climate justice research, focusing specifically on moral arguments and their prevalence in public discourse about climate changes impacts and adaptation.

In previous research, it has been argued that moral dimensions of public discourse about climate change give salience and political legitimacy to policy interventions as well as their processes and outcomes. Moreover, there is evidence that moral framings of public policy issues affect engagement according to political orientation. That is to say, different forms of moral framing resonate to a greater or less extent with differing political rationalities (Skitka and Bauman 2008, Feinberg and Willer 2013, Vainio and Makiniemi 2016). If that hypothesis holds true, then it is important to examine how moral framings appear in public discourse and the different forms that they take in order to better understand issues of political legitimacy. Here, we analyze deliberative discussions with members of the public to examine the ways that people reason about the need for and relative importance of climate change adaptation, compared to other policy issues. We identify multiple interpretive moral discourses through which people give meaning to the issues, and frame what is at stake with regards to climate adaptation.

Here, we build from the core insight of moral foundations theory; that is, that moral framings are prevalent in discourse about many policy dilemmas, and importantly are highly diverse. We develop an analytical framework of moral reasoning that distinguishes between what we term systems-based and vulnerability-based conceptions, and test the validity of the resulting typology using data from public discourse on the topic. We show that diverse forms of moral reasoning, which appeal to both vulnerability-based and system-based conceptions of morality, are relevant in lay reasoning about the relative importance of adaptation as a public policy issue. Finally we discuss how the presence, absence, and even dominance of different moral framings have significant implications for the governance of adaptation.

Moral framing, values, and foundations

Environmental values and action on climate change

A large body of work has examined the relative importance of moral framings for generating action on climate change at both individual and

collective scales. For example, within debates about pro-environmental behavior and attitudes around climate change there is a core set of concerns about the implications of framing. Part of this debate is on the relative importance of appealing to instrumental values – such as economic rationality – versus moral or ethical descriptions of the environmental issue (e.g. Markowitz and Shariff 2012). Sometimes, it seems, pro-environmental behavior is completely absent, even when it is self-evident that there are good economic reasons to act. In other words, economic rationality is limited in its ability to produce optimal environmental outcomes, even in the circumstances of perfect markets and perfect information. Of course in reality major resource issues such as climate change, the use of polluting energy sources, and land use change do not operate with perfect markets and perfect information. Rather they are characterized by pervasive market failures. Hence, it would seem that appeal to instrumental values and private economic rationality are even more severely limited as solutions to climate change challenges.

Many disciplines and studies explain lack of pro-environmental behavior according to problems of moral and ethical connection (Butler 2010). For instance, Markowitz and Shariff (2012) argue that the abstract intangible nature of climate change dampens emotional reactions and fails to activate our moral intuitions. Numerous social theorists point out how the lack of causal connections in relation to complex, large-scale, contemporary hazards like climate change, limits the possibilities for moral accountability (e.g. Beck 1992, Jamieson 2007, Giddens 2009). Butler *et al.* (2015) highlight how this affects the social embedding of the moral imperatives that shape action for climate in contrast to where there are direct connections to impacts, such as physical violence toward others. That is to say, the wrongness of imposing harm on the health of others by driving a high-emission car does not invoke the same moral social response as that of directly and physically assaulting an individual (Sinnott-Armstrong 2005, Butler *et al.* 2015). Other research has shown how frames that appeal to moral principles or ideals are likely to have deeper resonance and better outcomes for social action on climate change than those using economic rationales (Corner and Randall 2011). All these points suggest that, in the context of climate change mitigation, moral arguments have greater potential for motivating change. Morals matter, it is argued, because if issues are not perceived as moral, then the impetus for action is significantly diminished (Gifford 2011).

In general then, the significance of moral engagement, or lack thereof, with climate change as a premise for mitigation action is a central concern of social science in this area. The concern with, and indeed the advocacy of, the moral imperative of action on climate change, is based on the notion that when individuals are morally engaged with an issue, they are more

likely to act, acquiesce, or vote on it, even without scientific arguments or economic incentives.

Moral reasoning and public policy

Moral foundations theory argues that moral values affect both private action and collective action within the public sphere. The research in this area focuses not just on whether moral arguments are deployed but also on the broad types of moral reasoning that can be characterized when one looks beyond individual minds and psychological mechanisms and across diverse cultures. Graham et al. (2011) position moralities as emerging through the interactions of large numbers of people with each other, which are constrained and enabled by culturally and historically specific sets of institutions and technologies (Graham et al. 2011). By approaching moral systems in this way they bring into view a set of social and psychological foundations on which different cultures construct their moralities. These include harm and care, fairness and reciprocity, in-group identity and loyalty, authority and respect, and purity and sanctity (Haidt and Graham 2007).

Moral foundations theory thus provides a conceptual organization for measuring and describing differences in moral concerns across individuals, social groups, and cultures. Graham et al. (2011) have applied it in particular to understanding and explaining differences in engagement with public policy issues according to political orientation. They suggested that those of differing political orientation (liberals and conservatives) identify to greater and lesser degrees with different moral foundations, resulting in challenges for collective action that appeals to different groups (Feygina 2013, Rossen et al., 2015).

Given variation according to political beliefs with regards to environmental issues, moral foundations theory has since found application in environmental and climate change research. For example, Feinberg and Willer (2013) used moral foundations theory to analyze the moral arguments used to persuade or legitimize action on climate change, and showed that these appealed more to individuals of a liberal political direction than conservatives. They explain this by showing that it is the types of moral arguments that are used that create the divergence. Feinberg and Willer (2013) suggest that most arguments on climate change are based on appeals to the idea of 'protection from harm', either for the environment or for vulnerable people. These harm-based and care-based forms of moral reasoning resonate more strongly with liberal political orientations than they do with conservative positions.

Feinberg and Willer found, in the US context of their study, that conservative-leaning individuals articulated moral concerns in terms of respect for authority and preservation of systems, patriotism, and ideas of sanctity

and purity. Since these forms of moral argument were not as prevalent in climate change media discourse as those that held more salience for liberals, they argue that there is less tendency for conservatives to see it as a moral issue. Feinberg and Willer argue that the specific types of moral reasoning deployed therefore make a difference to support for and propensity to undertake climate change action. This means that within climate mitigation research, the moral foundations of support for political action have been found to connect more strongly with liberal political orientations than more conservative political positions.

As noted above, moral concerns have different resonances in different social, political, and cultural contexts. The types of moral reasoning identified by Feinberg and Willer have been shown to be present, but with very different expression, for example, in Finland. Vainio and Makiniemi (2016), looking specifically at climate-friendly behavior, show that moral concerns mediated reported actions and that people used multiple moral foundations when interpreting climate change. Research to date that has tested and applied moral foundations theory, in general argues for a change in communications about climate change to position the issues in terms that have relevance across a wider range of moral intuitions. For example, the moral foundation of purity and sanctity appeals more to conservatives, and could be aligned with arguments deployed to engender action on climate change.

So moral reasoning is not monolithic. Rather, it is multiple and is deployed by different groups, to different ends. The implications of this diversity for climate change adaptation are profound.

Moral reasoning for adaptation dilemmas: a conceptual framework

Studies of moral framing related to pro-environmental positions have focused almost exclusively on issues of consumption and other actions that induce environmental externalities. In the climate change arena, studies have therefore focused on mitigation of greenhouse gas emissions. They have examined the moral underpinnings concerning motivations for emission-reducing behavior (e.g. Feinberg and Willer 2013), or have examined issues of moral engagement with climate change more broadly (Hulme 2009). These ideas are equally relevant for examining climate change adaptation: questions remain concerning what the moral arguments are for adaptation and the extent to which they manifest through public deliberations. Here we advance a typology of moral intuitions related to climate adaptation (Table 1). It is based on prior descriptions of moral foundations, and builds on significant theory and evidence of the ethics and social challenges of adaptation and social differentiation in vulnerability to the impacts of climate change (Adger *et al.*, 2009, Thomas and Twyman 2005, Dow *et al.* 2006, Paavola and Adger 2006, Graham *et al.* 2015).

Table 1. Vulnerability-based and system-based dimensions of moral positions on climate change.

Vulnerability-based moral positions	System-based moral positions
Solidarity	Respect for authority
Ability, need, and entitlement	Stability and system preservation
Fairness in burdens	Duty and responsibility (e.g. to country through patriotism)
Protection from harm	Sanctity, purity, and naturalness

Previous research on moral foundations has largely been grounded in quantitative research testing the relationship between moral foundations and different aspects of social action such as climate-friendly consumption. Qualitative research interested in the role of moral positions for engagement with climate change has been less prevalent. There are, however, a small number of studies that have examined closely related issues. For example, within climate justice research, Klinsky and colleagues (2012) examined how justice arguments differ when the lay public talk about fairness in mitigation (reducing emissions) and adaptation (risks imposed on populations and investments to reduce these). Klinsky showed that in discussing adaptation, arguments about ability, need, and entitlement are stronger elements in deciding what is fair, than in discussion on mitigation.

The typology in Table 1 distinguishes between two broad types of moral arguments. We term these *vulnerability-based* moral arguments (aligned with liberal positions) and *system-based* moral arguments (connected to conservative orientations). Vulnerability-based arguments (Column 1) are based on notions of the unfairness of imposing harm on others, on solidarity with those on whom harm has been imposed, and on the rightness of protecting vulnerable populations according to ability and need. The vulnerability imperative has long been at the center of discussions on climate change harm, based on the idea that special attention must be given to the most vulnerable (Dow *et al.* 2006).

The system-based moral arguments in Table 1 (Column 2) concern issues of respect for authority, and of duty and responsibility, not least to country of citizenship (manifesting as patriotism) and fellow citizens (Rossen *et al.*, 2015). A further strand is the moral wrongness of spoiling nature and the natural world. These differing moral positions are derived from moral foundations theory combined with insights from the adaptation literature. Though we are not explicitly concerned with the political orientation of the people within the empirical research, we are interested more generally in the extent to which we find these differing forms of moral engagement in discussion of adaptation more broadly, or if one set of moral positions is more or less prevalent than the other.

Public engagement with climate change adaptation

Most research in the area of public perceptions of adaptation to climate change risks has typically focused on populations directly affected. Much of this work draws on contemporary exposure to risks such as flooding, wildfire, drought, and heat wave. Some focuses on the nature of vulnerability in affected populations, their adaptive capacity and agency, and even the impact of experience of weather on their willingness to undertake mitigation and their environmental attitudes (Spence *et al.* 2011, Marshall *et al.* 2012). Much less of this work focuses on general public attitudes, irrespective of whether those individuals are directly at risk themselves.

The importance of investigating wider public perspectives on the risks of climate change and views with regard to adaptive action is underpinned by a number of linked imperatives. First, it has been shown that the effectiveness of strategies for adapting to climate change will depend in large part on the public acceptability of options (Adger *et al.* 2013). Second, because the regulation of adaptation is likely to occur in domestic arenas, governance systems and populations are deeply implicated in the development and deployment of adaptation strategies (Klinsky *et al.* 2012). Third, there is evidence of existing public conflict around proposed adaptation strategies such as resettlement, flood risk management, nature conservation, cultural heritage, and others. Hence, public engagement is likely to be crucial in avoiding exacerbation of such conflicts. Finally, echoing the conceptual and empirical arguments in support of greater public engagement that have occurred in science and technology studies, it has been asserted that it is vital to engage with members of the public to 'bring novel information or perspectives into the discussion' (Klinsky *et al.* 2012: 863; Carmin and Dodman 2013).

We argue that it is important to examine the general political climate on adaptation, because it raises issues of political legitimacy associated with action on climate change and provides insights relevant to understanding public engagement. Cash *et al.* (2002) discuss the importance of *salience* (how relevant information is to decision-making bodies or publics) and *legitimacy* (how fair an information producing process is and whether it considers appropriate values, concerns, and perspectives of different actors) for environmental decision-making. Here, we provide insight regarding the ways that climate change adaptation might be salient for different publics (i.e. in terms of different moral intuitions) and highlight public values, concerns, and perspectives that are important for understanding the legitimacy of different responses.

Context, design, and methods

The analysis focuses on whether different forms of moral reasoning present in discussions among the UK public concerning climate change adaptation?

Where moral reasoning is present, we examine which dominant themes and types of moral framing are prevalent or appear to be most salient. In the UK the political focus on adaptation is institutionalized within the Climate Change Act of 2008, which as well as setting obligations for decarbonization, also has responsibility for assessing risks and in effect making the UK climate-ready. Hence, climate change adaptation in the UK is, in policy circles, understood as a set of obligations on government departments around risk.

The data were derived from a set of facilitated discussion groups on climate change risks and adaptation undertaken in the UK during 2013. The focus groups were commissioned by the UK Government Department for Environment Food and Rural Affairs (Defra) as part of their processes for developing the UK's National Adaptation Plan to meet obligations under the Climate Change Act. Defra commissioned a structured representative sample survey of individuals using mainly closed-ended questions, implemented by IPSOS-MORI (participant $n = 2,007$) alongside 14 qualitative facilitated discussion groups (participant $n = 148$). The discussion groups were implemented across a total of 13 locations (including 2 in Scotland, 2 in Wales, and 1 in Northern Ireland), varied by the extent to which they were urban or rural and their exposure to climate risks. Participants were sampled to ensure a mix of age, gender, and social grade across the group discussions (see Ipsos MORI Research Institute 2013).

Analysis of the data from the nationally representative survey of individuals by Taylor *et al.* (2014) focused on how experience of extreme weather, such as flooding within the respondents' area, affected how they perceived the seriousness of climate change, and showed that indeed weather-related hazards did affect climate change attitudes. That analysis used data from closed-ended questions from the individual survey and hence does not reveal underlying attitudes or reasoning. For the current analysis, we were given access to the recordings of the discussion groups and had a subset of them transcribed to allow for detailed analysis. The subset selected was based partly on the location of the groups and partly on the quality of the recordings themselves. Additionally, some group discussions were not recorded, so we could not access all 13 groups. The subset of the groups that we were able to have transcribed included those in Belfast, Bristol, Birmingham, London, and Brighton (participant $n = 57$).

Here, we present the first detailed analysis of the qualitative discussion group dataset; ours is one of only a handful that examines national data from UK publics on climate change adaptation. The data were collected and designed to explore lay perceptions of adaptation to climate change, and participants were encouraged and prompted to talk through their logic and positions: hence the data are highly suitable for analysis of the underlying reasoning, and have been coded to meet that objective. There are clearly challenges in analysis of open-

ended qualitative data not focused on specific themes intended by those that collected the data (Hofferth 2005). But we interrogate the data through a specific analytical lens, seeking to squeeze every ounce of explanation from this rich source (Bryman 2008, Shirani *et al.* 2013).

The transcripts were analyzed utilizing a bottom-up thematic approach whereby codes (or prevalent themes) were derived from readings of the material (see Denzin and Lincoln 1998). The research team identified the presence of moral reasoning within the discussion groups through this initial coding. A second in-depth coding interrogated the data focusing on how issues around adaptation were articulated within different moral frames. This second phase involved an iterative process of categorization derived from the literature to identify moral arguments, while still allowing for alternative or new forms of moral reasoning to emerge from the data. Through this process, the analysis highlights the relevance of different types of moral reasoning for engagement with climate adaptation.

The analysis opens up insights into processes of moral reasoning about adaptation among lay publics. The analysis is novel, because first, there is limited existing research on the general political climate or social mood relating to adaptation, and second, dimensions of moral reasoning within public discourse about adaptation have been neglected within climate change research more broadly.

Results: public discourse, adaptation, and moral reasoning

Through this section, we examine the relative prevalence of different types of moral reasoning in the context of adaptation and explore what this might mean for implementing legitimate governance of adaptation. We contextualize this through reference to the table and typology of forms of moral reasoning introduced in Table 1. In Table 2, we offer example statements to give insight into the forms of reasoning that we found across the groups. In what follows, we unpack these different types of moral discourse with reference to illustrative examples from the data.

The discussion group data reveal the prevalence of a wide range of moral arguments spanning the vulnerability-based and system-based spectrum. Much *vulnerability-based* discussion focused on solidarity, protection from harm, and fairness in burdens. Discourse encompassed different dimensions of these vulnerability-based beliefs. For example, notions of *solidarity* were revealed in part through talk about the need to protect populations from climate risks across different groups and regions. Discussions, in this sense, revealed sensitivity to social and geographical scale within the adaptation dilemma. Participants in London, for example, when confronted with a dilemma over their local



Table 2. Vulnerability-based and system-based dimensions of moral positions on climate change – dimensions in public discourse about impacts and adaptation.

Vulnerability-based moral positions	Vulnerability-based morals exemplified in impacts and adaptation to climate change	System-based moral positions	System-based morals exemplified in impacts and adaptation to climate change
Solidarity	Concern about weather extremes impacting on populations across class and geography	Responsibility and respect for authority	Trust in states to act in long term collective interests
Ability, need and entitlement	Concern about lack of adaptive capacity among groups or regions	System preservation	Ways of life and economic interests take precedence
Fairness in burdens	Willingness for public expenditure on protection of vulnerable populations	Patriotism	Duty to protect cultural and natural icons important for national identity
Protection from harm	Duty to avoid imposing knowing damage on others	Sanctity, purity, and naturalness	Duty to protect and not defile nature for intrinsic reasons

versus national priorities, emphasized the interdependence of decisions and ideals of the ‘greater good’:

Facilitator: That’s an interesting point, as Londoners, would you rather spend the money on [the Thames barrier and flood protection for London] or on agriculture generally for the whole country? What do you think is the most important?

Participant: The greater good, so there will be agriculture for the whole country [Participant 8, London].

Discussion of how to understand and characterize climate impacts also revealed significant solidarity with others. Participants articulated ideas that to some extent sit at odds with policy assessments of risk, with people highlighting vulnerability, and the extent of effects on even small numbers of people as important:

A minor effect on a lot of people we put as sort of a big impact, ***a large effect on a smaller amount of people is also a big impact*** [Participant 2, Brighton].

This contrasts with policy assessments that situate risk in terms of likelihood and consequences calculated in primarily economic terms, and thus favoring protection of larger numbers over the extent of the impact. In the discussions the issue was reformulated in moral rather than economic terms meaning that large effects on small numbers were given greater weight than is the case in current policy.

Many discussions highlighted issues of solidarity in responses to climate impacts, referencing the importance of social cohesion. For instance, participants noted that climate change adaptation was likely experienced as disruption through extreme events, and that in these circumstances social cohesion comes to the fore. In one instance, this was articulated by making an analogy with terrorist attacks in London.

I don’t think that people in local areas mind sticking together in rough times, like when the bombs went off, people did stick together in times of adversity but I think it’s wrong when the rich are getting richer and the poor are getting poorer, to make the poor pay more, it just doesn’t make sense [Participant 4, London].

This quote not only highlights the relevance of solidarity-based principles in discourse about climate adaptation issues but also raises the ability of populations to pay, and hence ethical questions about the distribution of costs and benefits, such as the placing and prioritization of flood defenses. In this context, *fairness in burdens and protection from harm* formed core principles, with the allocation of limited resources to protection from climate risks being discussed in terms of the vulnerability of different social groups (e.g. rich and poor) and at different times of life (e.g. young and old).

... someone like that for example probably wouldn't have home insurance, I don't have home insurance because I can't afford it and I can imagine it's the same for people who are on benefits, if their homes were flooded and they didn't have home insurance, that would be everything that they owned just gone. And then how would they, on the income they've got, afford to then replace everything? [Participant 11, Birmingham]

For me though ... I'm not doing it from a selfish point of view, because I teach new generations, I see it as what impact it's going to have on them ... [Participant 1, Brighton].

Participants' articulations of moral positions that related to fairness in burdens connected closely to perspectives on *ability, need, and entitlement*. Fairness was related to views on the capacity of different groups to respond and adapt to change themselves, with those situated as less capable being positioned as in greater need of support:

Participant: The impacts on vulnerable people. I think that's very important.

Facilitator: Who do you count as vulnerable?

Participant: Elderly, disabled ... young ... Because they're more capable of looking after themselves, an elderly person isn't [Participant 1, Birmingham].

Vulnerability-based perspectives and discourse-entailed recognition of the dilemmas associated with positions on adaptation embedded in notions of solidarity:

I would like to see, most people would, put them [flood defences] by the old people's houses ... But they don't all live in one area ... [Participant 8, London].

The reasoning concerns the spatial distribution of impacts: vulnerable populations are dispersed. But participants also raised questions about how to define and characterize the vulnerable:

Also when it comes to the rich being able to look after themselves, where is the cut-off point? There are always going to be ... people who may be property rich but don't actually have any cash. Or people who are just on the boundary, who are just a bit too much, so still don't have enough to spend their way out of it but also don't get any money to help with it so ... [Participant 3, Bristol].

In this respect, there was recognition in public discourse of the difficulties associated with making judgments about who is vulnerable with respect to climate adaptation. Clearly embedded within this kind of discursive reasoning there are core forms of moral reasoning about fairness, vulnerability, protection, and differential capabilities to respond to climate impacts. In previous research, these forms of moral intuition have been highlighted as those that are given primacy in discourse about climate change mitigation (Feinberg and Willer 2013, Vainio and Makiniemi 2016). Here, we not only show their relevance for public

engagement with climate adaptation but we also found forms of system-based moral reasoning about the issues.

System-based moral intuitions, as defined above, coexist in the data alongside the focus on vulnerability-based forms of moral reasoning. The issues of responsibility, of *respect for and trust in authorities*, and of doing the right thing by the country or for nature (*sanctity, system preservation, and patriotism*), are apparent across the group discussions. Participants articulated the need for governments to act to adapt to climate change. Yet, the underlying moral position on this topic emphasizes the common good and the perceived legitimacy of adaptation decisions taken through democratic governments. Such sentiments are articulated thus:

The way I see it is when you pay tax, you put your trust in the government, whether you trust them or not, it's trusting in the government to allocate *those funds for the general greater good* [emphasis added] [Participant 4, London].

Yeah we're responsible, we're responsible for it but at the end of the day as an individual my one little ... makes no difference really, it's the government that is eventually going to have to make the decisions that affect all of us and *it's our responsibility to sort of vote in a way that we feel we should go* but ... regardless of how we feel, they make the decisions, not us [Participant 5, Brighton].

Much discussion on responsibility for action focused on the duties of individuals and of governments, including the importance of regulations, systems, and economic processes. For example, when discussing heat wave risks and adaptation, participants grappled with the extent to which individuals could take precautions, and highlighted the role of government regulations, particularly in ensuring vulnerable populations are not exposed to risk:

I do think the government should do something if these are the figures and like this is what they've been told and that realistically they need to think about ... I think in a way, for the hot weather, people can also buy their own, the majority of people can buy their own fans and they can sort of understand that hot weather, you need to take certain precautions ... But when they're building social housing now, they should think about the fact that maybe this could be an issue so make them flood proof and put some more vents in so it's ... those kinds of steps [Participant 6, London].

The issue of duty and responsibility in system-based moral articulations of the adaptation challenge was less prevalent than solidarity discussions across the groups. Yet, discussions frequently highlighted the issues of moral hazard: government action inadvertently increases personal risk by drawing down collective risk. Much discussion of a moral hazard in adaptation, though not using those words, focused on the benefits of market signals and individual responsibility to act within economic systems. For

example, one participant highlighted how market processes could ultimately lead to solutions for coastal erosion:

Everyone's going to hate me for saying this but I think that is also an acceptable solution because I think that eventually people do take responsibility for their actions and they will see, 'right, the coast is eroding, let's not live there' and then the market will sort itself out and corporations will invest in irrigation, in nicer whatever that is, urban areas [Participant 4, London].

This quote is indicative of the position that it is morally acceptable to do nothing and allow the market to deliver a solution. Such forms of reasoning on adaptation appeal to intuitions of individual duty, respect for authority, and system preservation. Sanctity and purity of nature as well as patriotism – manifest as relating to the protection of British identity or cultural assets – also ran through public discourse:

... people care enough about ... things like complete loss of protected habitats, you won't get that back or like losing native species, that's irreversible.

[Participant 3, Bristol]

Participant: Protecting national ancient ruins and that, sometimes are on coastal lines, obviously with erosion and whatever.

Facilitator: So sort of heritage, things we might lose, important things. Why is that important to keep?

Participant: I like keeping in touch with heritage ... [Participant 4, Bristol].

Overall the analysis reveals how varied forms of moral reasoning are deployed in discussions of climate change adaptation. They include both system-based forms of reasoning, highlighted as resonating more strongly with those of conservative political orientation, and vulnerability-based reasoning. Though we have not sought to distinguish between different political positions, through this analysis we have been able to identify the relevance of multiple forms of moral reasoning for public engagement with climate change adaptation. This suggests an important role for moral frames in engaging people with climate change adaptation as much as mitigation.

Discussion

The analysis demonstrates the diversity of types of moral reasoning that are deployed in discussing climate change adaptation. But the data also underscores how risks are frequently, and often dominantly, framed in public talk as moral issues rather than issues of economic rationality, likelihood, or individual concern. The participants, when asked to deliberate about the risks of climate change and potential adaptation policies and strategies, articulated these dilemmas in moral terms, crucially using both vulnerability-based and system-based arguments.

The observed emphasis on moral arguments in adaptation provides evidence and gives comfort to those advocates, and indeed philosophers and communications experts, that focus on morality as the key to solving the climate change problem. Most of that literature highlights how the vast majority of discussions on climate change within public policy are focused on economic arguments about present and future costs, and bemoans the lack of emphasis on moral dimensions, as well as critiquing policies that rely on extrinsic rather than intrinsic motivations for potential action (Corner and Randall 2011, Crompton 2011).

The findings also support an emphasis on the different kinds of moral foundations that could form a basis for galvanizing action about climate change. Feinberg and Willer (2013) highlight how framing climate change as a moral issue has important implications for engagement with the issues, while also showing that climate communications are typically grounded in particular moral foundations, rather than more diverse forms. Jamieson (2007) argues that the moral distance between cause and consequence can only be resolved through new ethics and duties of care for the human and nonhuman world, while Gardiner (2010) hints that empathy and recognition of the human causes are central to implementing climate justice.

The dominance and diversity of moral frames for adaptation shown in the analysis have significant implications for governance. There is, for example, the potential for vulnerability-based motivations to increase levels of support for recovery processes and adaptation measures. Several examples of this were evident during the 2013/2014 winter floods across the UK. Direct support for recovery in agricultural areas affected by floods was seen through initiatives such as Forage Aid that channeled donated animal feed from farms across the UK to flooded farms in Somerset. Many people from across affected and unaffected regions in the UK volunteered their time to help those directly affected in flooded areas. Similarly, there are widespread expressions of solidarity for flood victims or populations affected by wildfire, documented for example in the case of the Brisbane floods of 2011 (Wickes *et al.* 2015). Solidarity also finds expression in public policy arenas and demands for action. In the UK, examples of vulnerability-based moral intuitions saw people support campaigns for the release of extra national funds to undertake flood prevention measures following the 2013/2014 winter floods, beyond those that had previously been allowed under policy and cost-benefit rules.

System-based moral reasoning, by contrast, has greater resonance with those policies aimed at prevention of impacts, and protection of sovereign territory and nature. The discussion of climate change impacts at a global scale is increasingly articulated as a threat to national security interests of states, and to a lesser degree of human security. There are inevitably significant critiques of the securitization of such debates (Oels 2013). Yet, the need for precautionary action for the protection of citizens and the

emphasis on benefits within nations appeals to more system-based forms of moral reasoning, such as duty and care.

Are the results robust? Or are the results specific to the UK? First, the UK context means that the types and impacts of climate change are specific to the geographical setting. Perceived differences between risks for the UK meant that focus group participants, when asked, almost exclusively ranked and prioritized floods over heat risks. Part of the explanation is related to the timing of the focus groups: winter weather and concurrent floods in UK inevitably influenced these perceptions. Capstick *et al.* (2015), on reexamining data on UK public attitudes over the past 15 years, found that the relative importance of climate change as an area of concern has shifted over time, while the underlying discussions of climate change as a moral issue are more stable. We suggest therefore that within the geographical context, the results of our analysis are at least confirmed by other evidence.

But is the UK a special case? A significant amount of research on public attitudes to climate change (though not necessarily on moral dimensions) has focused on the UK and the US. Lorenzoni *et al.* (2006), for example, found significant differences between public acceptance of climate change as a reality and as a concern. Tvinnereim and Fløttum (2015) by contrast found that public discourse on climate change in Norway emphasizes social dimensions over economic dimensions, unlike in the US and the UK studies. So we cannot conclude emphatically that the specific findings on about adaptation topics would be widespread and universal. Yet the result certainly resonates with findings from Norway and elsewhere where the contexts for the dimensions of moral talk are highly diverse.

Conclusions

Previous research has highlighted the relevance of moral framings for action on climate change. It has focused primarily on salience of the topic and links to general pro-environmental behavior. Here, we have interrogated for the first time the forms of moral reasoning within public discourse on issues of the potential impacts of climate change. We find, crucially, a diversity of moral positions expressed on climate-related risks and the options for adaptation, but with a dominance of vulnerability-based articulations of moral reasoning.

We suggest, therefore, in line with moral foundations theory, that moral reasoning has public policy implications. The results presented here have important implications for the governance of adaptation, not least in the political legitimacy of different strategies. Despite the diversity of moral reasoning, vulnerability-based motivations, as we define them here, have high salience and are prevalent in public discourse. This suggests that the public is more likely to give support for policies that invest in marginal

areas, even at higher cost. Similarly, such motivations are more likely to lend legitimacy to a focus on vulnerability as the key parameter for prioritizing action. This is relevant both for local-level decisions and investments, as it is globally.

The results resonate with emerging theory and evidence on the governance challenges of adaptation. First, the salience and legitimacy of adaptation strategies and policies are clearly determined by public awareness and acceptability. Where societies recognize that the impacts of climate change are harmful and will be imposed on groups who do not deserve it within those societies, there is often the demand for policy change and a renegotiation of responsibilities of public and private actors in dealing with the risks (cf. Adger *et al.* 2013). The findings of this study suggest that demand for change will likely be articulated through moral terms, such as the recognition of the need for solidarity and fair distribution of the economic burdens of adapting to risks such as flooding.

This research finally highlights the relevance of moral intuitions for those experiencing the real impacts of climate change for public responses, going beyond a focus on mitigation. In particular, we show that there is scope to engage people with climate change adaptation by mobilizing diverse forms of moral reasoning and frames. The scope of climate justice is therefore expanded: on the basis of this evidence, climate change is perceived and understood to extend beyond pro-environmental behavior to the impacts and potential adaptations as moral issues. Such moral reasoning could form the basis of public support for adaptation as well as wider engagement with climate change as the implications for others become apparent.

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