

Will Morality or Political Ideology Determine Attitudes to Climate Change?

Sharon L. Dawson
Graham A. Tyson
Charles Sturt University

Climate change is a major moral and political challenge facing Australia. Public attitudes to the issue influence public policy in respect of responding to climate change. Using Moral Foundations theory, this study investigated the relationship between attitudes to climate change, individuals' moral intuitions and political affinity, using a sample of 487 Australian adults between the ages of 18 and 86 years. Patterns of moral intuitions scores which are higher for harm and fairness and lower for in-group, authority or purity, correlated with liberalism and self-reported left-wing political orientation, and predicted a preference for a strong response to climate change irrespective of self-interest. Patterns of moral intuitions scores, which focus more equally on all five foundations, correlated with conservatism and self-reported right-wing political orientation, and predicted a preference for a reduced response. Specifically, intuitions concerned with harm and fairness were predictive of preference for stronger responses, whereas those concerned with loyalty to in-group were the opposite. Overall, moral intuitions predicted attitudes to response to climate change, but the relationship was partially mediated by political affinity. The study is further evidence of the relevance of Moral Foundations Theory to moral issues, particularly those requiring a political response.

Climate change is currently prominent in public discourse; involving environmentalists, scientists, economists, industry bodies, international agencies and governments across the globe. Much of this discourse is concerned with determining the response world communities will make to climate change and establishing timeframes for action. The recent Copenhagen Summit is an example of the ongoing meetings leading this process. Irrespective of the scientific and economic policy aspects of the issue, responding to climate change poses a fundamentally moral problem in three parts. The problem involves aspects of the Prisoners' Dilemma because only cooperation will provide the optimal solution in terms of costs and benefits; the Tragedy of the Commons because continued pursuit of self-interest may destroy the resources underlying our prosperity and our lifestyles; and a Free-rider problem because of the potential benefits of opportunistic behaviour to individual communities (The Economist, 2009). As a result, negotiations between

nations are complicated because the optimal response to climate change will require the subordination of short-term self-interest so that long-term shared benefits are the result, and such responses are voluntary.

These dilemmas exist at the individual level also, where the present generation can choose from a spectrum of potential responses ranging from no response being necessary to radical changes to almost every aspect of human activity, with limited consequences for themselves. The issue of subordinating self-interest is exacerbated by the intergenerational aspect of climate change which allows present generations to make no changes that would affect their lifestyles – to the possible detriment of future generations. Alternatively, present generations can make sacrifices that they will not benefit from but which are likely to benefit not only their own future generations but also those of other communities who may not make similar changes. This represents a temptation to do nothing or do no more than others. Beyond this basic issue

of free-riding is the temptation to make a relatively weak response to climate change which may be to the economic detriment of individuals or nations that make greater sacrifices. This is a negative externality, which is similar to free-riding but a more malign form of self-interest.

In the context of choice between gratification or subordination of self-interest where immediate personal consequences of self-gratification are not significant, the response to climate change is readily identifiable as a moral problem. The psychology of moral decision-making is therefore relevant to understanding individuals' attitudes to this issue. Like individuals, each nation's participation is voluntary and subject to considerations of national self-interest. A global response to climate change requires collective decision-making by governments to intervene in their own national economic systems, so that a cohesive and optimal global response is effected. National responses can only occur through political processes in each country, so theoretical frameworks of moral psychology will be most useful if they are universal in their applicability and can demonstrate a clear connection to political ideology and behaviour. This research aims to use Moral Foundations Theory to investigate attitudes to climate change response. As most of the research that has led to the development of the theory has been North American and European, a secondary aim is to use it in an Australian context.

Moral Foundations Theory

Moral Foundations Theory proposes five foundations which manifest as automatic emotional and cognitive reactions (called intuitions) to environmental stimuli (Haidt & Joseph 2004). The intuitions drive moral decision-making through a psychological preparedness to notice and to approve or disapprove of particular aspects of situations or issues (Haidt & Graham, 2007), prior to any conscious reasoning process (Haidt, 2001). There is evidence for the existence of

unconscious processes generally (Nisbett & Wilson, 1977); and specific to moral decision-making, North Americans and Brazilians have found it difficult to justify in any rational way their reactions of disapproval to stories of norm violations that clearly do not create harm (Haidt, Koller, & Dias, 1993). This initial approval or disapproval can be interpreted as an unconscious driver of the attitudes that individual's take to situations and behaviours that they observe in the world. The intuitions extend beyond their initial evolutionary domains to other domains of modern social relevance (Haidt & Joseph, 2004) which makes them relevant to attitudes to climate change.

Moral Foundations Theory extends the scope of the moral domain beyond the traditional values of preventing harm (Gilligan, 1982) and promoting equality and fairness (Kohlberg, 1981). The Harm/Care moral foundation seems to reflect what Gilligan meant, as it is sensitivity to the suffering of others, resulting in compassion and empathy. Originally derived from the need to protect one's children from danger, it has been extended to other people and to dangers other than physical dangers (Haidt & Joseph, 2004). The Fairness/Reciprocity foundation derives from the benefits of altruistic behaviour and the detriment caused by cheating behaviour to individuals and the group as a whole in group living arrangements. This is very similar to Kohlberg's view of justice, and it results in gratitude for reciprocal altruism, and guilt if one is the perpetrator or anger toward the perpetrator of unfair treatment of others, (Trivers, 1971; Haidt & Joseph, 2004; Brosnan, 2006). These two types of intuitions suggest a positive attitude to the response to climate change, where self-interest may be subordinated to concern to prevent further harm to the planet and or to be fair to future generations.

The In-group/Loyalty foundation relates to the value to the individual of group membership such as protection and shared

resources, and manifests in trust and pride towards the in-group, anger towards traitors; and wariness and distrust towards the out-group (Haidt & Graham, 2007). Also derived from the conditions of group living, the Authority/Respect foundation relates to social hierarchy and respect and deference for those in higher positions and resentment of attempts to undermine existing hierarchies (Haidt & Joseph, 2004). Extended beyond privilege for dominant individuals in exchange for group protection (Haidt & Joseph, 2004), it is based on the prestige accruing to successful individuals because of the information goods they have (Henrich & Gil-White, 2001); and has been depersonalised to extend to legitimate authority including traditions and societal structures as well (Haidt & Graham, 2007). The last of the five foundations is Purity/Sanctity which relates to bodily sanctity and disgust at violations of group norms. Based on the enforcement of hygienic practices to prevent the contraction and spread of disease and infection, it has been extended to include religious ritual and behavioural norms and taboos (Rozin, Haidt, & McCauley, 2000) and to devolve upon objects or traditions that are merely symbolic such as national flags (Haidt & Graham, 2007). These three intuitions suggest that attitudes to climate change may be negatively affected by the self-interest of groups that individuals' perceive themselves to belong to, even to the extent of free-riding or to create a negative externality.

The evolutionary basis of all of the five foundations suggests that Moral Foundations Theory will be able to be applied across cultures. Evidence for its universal applicability is provided by anthropological studies that were used in its development. These studies indicated three core ethics (Autonomy, Community and Divinity) which map to the moral foundations (Schweder, Much, Mahapatra, & Park, 1997). This suggests that the theory is likely to be relevant to issues such as climate change which requires a global response.

In summary, Moral Foundations Theory acknowledges the role of self-interest, but proposes that people also care about how others are treated through intuitions about Harm/Care and Fairness/Reciprocity; and how people behave in the context of groups through intuitions about In-group/Loyalty, Authority/Respect and Purity/Sanctity (Haidt, 2007). This dichotomous grouping of intuitions between group and non-group related intuitions is central to understanding how different perspectives may affect attitudes to issues. The political processes of nations are the link between individuals' attitudes and government actions and to climate change response in particular. Application of the model to political alignment, belief and voting behaviour has demonstrated some interesting linkages between political orientation and the relative weightings given by individuals to the five moral foundations (Haidt & Joseph, 2008; Graham, Haidt, & Nosek, 2009; Haidt, Graham, & Joseph, 2009).

Political Orientations and Morals

Studies of individuals ranging across the political spectrum from left to right show a slight reduction in the relative focus on Harm/Care and Fairness/Reciprocity; and a marked increase in the relative importance of considerations of In-group/Loyalty, Authority/Respect and Purity/Sanctity as political orientation of the individual moves across the left-right spectrum towards the right (Graham et al., 2009). Thus, self-reported liberals focus mainly on the foundations of Harm/Care and Fairness/Reciprocity, whereas self-reported conservatives tend to focus more evenly across all five foundations (Haidt & Joseph, 2008). This suggests that kindness and aggression (derived from Harm/Care) and fairness, honesty, trustworthiness, justice, cheating, and dishonesty (Fairness/Reciprocity), are the behaviours most salient to liberals; whereas conservatives place equal importance on all of these but also on self-sacrifice, patriotism, loyalty and cowardice

(In-group/Loyalty), leadership, obedience to authority, and disrespect (Authority/Respect) and temperance, chastity, piety, cleanliness and lust (Purity/Sanctity), (Haidt & Graham, 2007; Haidt & Joseph, 2008).

The differences between the relative weightings placed on the foundations by left-wing and right-wing individuals have been found to hold in studies of abstract assessments of moral relevance in making moral choices (Haidt & Joseph, 2008), and in studies looking at ratings of moral judgement statements (Graham et al., 2009). Further, they have predicted responses to moral judgement statements more strongly than responses to questions of moral relevance (Graham et al., 2009). Voting behaviour of individuals and their self-reported political ideology is highly correlated (Jost, 2006), so the relation between individuals' patterns of moral decision-making which correlate to their political orientation suggests that Moral Foundations Theory is likely to provide some considerable insight into political behaviour including voting on issues.

Moral decision-making is more complex than the simple mapping of relationships between moral foundations and political orientation outlined above, because each foundation may elicit responses contradictory to those of the other foundations, or the weighting given to each of the foundations may alter in respect of a particular issue. The pro-life and pro-capital punishment positions typically held by American (United States) conservatives (Cohen, 2003) may be an example of this flexibility in the manifestation of moral foundations. Such views may indicate that Harm/Care is more salient in the abortion debate than in the capital punishment debate. It may be though that there is a difference in relative importance of the foundations at the issue level, where for conservatives Harm/Care may be in the ascendant for abortion, but for capital punishment Authority/Respect is more relevant.

An alternative explanation of apparently

contradictory moral stances is that individuals may also be guided by their political orientation and give preference to their party's position irrespective of any contradictions therein. This explanation is supported by the finding that the objective quality of policy and individuals' self-reported ideological beliefs are both subordinated to the views that the individual perceives to be the stated position of their party and that this effect persists even when the perceived party position is completely at odds with the real party position (Cohen, 2003). Political ideology can distort as well as organise information through its biasing impact on attention, information processing and the encoding and recall of memory (Jost, 2006), and this biasing effect may also explain how political orientation predicts attitudes.

The effect of group dynamics and the biasing effect of ideology on attitudes to moral issues are likely to be stronger when individuals lack factual information particularly for complex issues such as climate change response. Brechin (2003) found that despite similarly low levels of understanding of the main causes of climate change (less than 20% of both Europeans and North Americans), the proportion of European citizens disapproving the United States government's withdrawal from the Kyoto Protocol was almost double that of United States citizens who disapproved. Brechin (2003) interpreted this to mean that in the absence of information or understanding, individuals are likely to adopt the stance of the political party they support. Notably, the proportion of Australians in that study who understood the main causes of climate change was also less than 20%, so the relatively low levels of understanding in the community may cause the attitudes of individuals in this research sample to align with the political party that they support as well.

Given the relationships between

political orientation and moral foundations discussed above, individuals' attitudes to particular moral issues such as climate change may be influenced by either political orientation or by moral foundations, or by a combination of both through mediation. Van Leeuwen and Park (2009) attempted to draw together the findings in respect of trait based needs to manage uncertainty and threat (Jost, Glaser, Kruglanski, & Sulloway, 2003), and moral foundations by postulating a conservative pattern of higher perceptions of social dangers, leading to a greater emphasis on those moral foundations that offer most protection from threat which are In-group/Loyalty, Authority /Respect and Purity/Sanctity because of their emphasis on retaining the status quo and opposing change. They found that the pattern of moral intuitions partially mediated the relationship between perceived threat and political orientation.

Whilst the work of Van Leeuwen and Park (2009) greatly assists us to understand an aspect of the interrelationship between political ideology and moral decision-making, it does not provide guidance as to the relationship between political orientation, moral intuitions and specific moral issues that require a political response. One recent study which has attempted to do so looked at which variables best predict individuals' opinions and policy judgements on moral issues such as abortion, stem-cell research, and gun control (Koleva, Graham, Haidt, Iyer, & Ditto, in press). Opinions were general statements of approval of behaviours, and judgements were support for laws and government policies that might be implemented. They found that for opinions on issues, moral foundations was superior to political ideology for 9 of the 13 issues, and was very close for 2 of the remaining 4. For policy judgements however, they found that political ideology was the better predictor for 7 out of the 11 policy issues.

A limitation of the Koleva et al. (in

press) study is that not all issues were common to both the opinion and the judgements studies. For the two issues that were common and yielded statistically significant responses, both opinions and judgements were best predicted by the same variable, but that key variable differed between the issues. This tentatively suggests that specific issues may elicit particular and tailored response patterns. Unfortunately, global warming was only considered in the judgement study, so the question of whether there are response patterns specific to particular issues is yet to be fully addressed. The study did find that the best predictor of judgements on the issue of global warming was ideology, and of the moral foundations the most significant predictors of response selection were the individuals' scores for Purity/Sanctity and for Harm/Care. This was interpreted as reflecting that nature is held sacred, and intuitions about harm extend to the planet as well as future generations (Koleva et al. in press).

Whilst Van Leeuwen and Park (2009) found correlations between moral intuitions, political affinity and perceived threat they did not look at specific issues such as climate change. Another study which did look at the relationship between attitudes to climate change policies and perceived threat of climate change measured perceived threat in terms of economic, health and environmental outcomes (Zahran, Body, Grover, & Vedlitz, 2006). They found that perceived threat of climate change was strongly correlated with support for political policies designed to counter climate change, and objective risk had little predictive value. Perceived risk may also influence moral decisions in favour of self-interest however because of the finding that individuals perceive much greater risk for other people than specifically for themselves (Bord, Fisher, & O'Connor, 1998).

In the light of the Bord et al. (1998) study, Kellstedt, Zahran, and Vedlitz (2008) distinguished between risk to individuals and to the general public in their study of the relationship between political ideology and

perception of climate change threat. Kellstedt et al. (2008) found reliability was high enough to combine the scores on perceived public threat and perceived personal threat into one measure however. They also found a predictive link between political ideology and perception of climate change threat. The Kellstedt et al. (2008) study contributed a further nuance to the research in this area by including political partisanship which had almost double the predictive value of political orientation. Their study is limited however because opinions were included in the study but policy judgements were not, which is the opposite situation of the Koleva et al. (in press) study discussed above. The findings of Kellstedt et al. (2008) in respect of perceived threat and political ideology are worthy of further attention and replication.

The gaps in the research on response to climate change and moral decision-making outlined above are the focus of this study. Inclusion of both opinions on climate change and judgements on policy responses as well as perceptions of the threat may build upon the findings of Koleva et al. (in press), Kellstedt et al. (2008) and the Zahran et al. (2006) study. Additionally, perceptions of threat information may shed light on the possibility of individuals' preference for policies in their self-interest because they may perceive the risks as greater for others which can be implied from the Bord et al. (1998) study.

Despite the gaps in the literature to date, it was hypothesised that individuals' moral foundations scores would predict all of the dependent variables which represent attitude to climate change, similar to the findings of Koleva et al. (in press). Specifically, it was expected that relatively high scores for Harm/Care and Fairness/Reciprocity would predict individuals' preferences for a stronger response to climate change; and that relatively high scores for In-group/Loyalty, Authority/Respect and Purity/Sanctity would predict individuals' preferences for a weaker response to climate change. Political orientation was also expected

to predict individuals' attitudes to climate change, replicating the findings of Kellstedt et al. (2008); such that affinity with relatively left-wing politics would predict individuals' preferences for a stronger response to climate change and relatively right-wing political affinity would predict individuals' preferences for a weaker response to climate change.

Overall however, it was anticipated that whilst individuals' moral foundations scores would predict attitudes to climate change, political ideology was expected to mediate those predictive relationships. The lesser weightings placed by more politically liberal individuals on intuitions concerning In-group/Loyalty, Authority/Respect and Purity/Sanctity compared to politically conservative individuals which have been found in other studies (Haidt & Joseph, 2008, Graham et al. 2009; Haidt et al., 2009) were expected to occur in this Australian study. That linkage between the political orientation and the pattern of relevance of moral intuitions is the underlying reason why a mediated relationship between moral foundations and opinions and judgements about climate change was expected.

Method

Participants

Participants were 211 males and 276 females aged between 18 and 86 ($M = 43.74$, $SD = 12.96$) with access to the internet, living in Australia, who chose to complete an online survey. Participants were drawn from all states and territories but predominantly from NSW (82.19%), with 75.91% resident in capital cities, and 24.09% from provincial centres and rural areas.

Materials

Opinions of perceived threat of climate change. Kellstedt et al.'s (2008) questions about the perceived threat of climate change were used with minor alterations to refer to Australia. The first three questions addressed perception of personal threat and was preceded by the statement "There are a range of attitudes to Climate Change and we would like

your views. Please indicate how strongly you agree or disagree with the following statements". Responses were captured on a four point Likert scale (from Strongly Agree = 1 to Strongly Disagree = 4) for the following three statements "Global warming and climate change will have a noticeably negative impact on: my health in the next 25 years; my economic and financial situation in the next 25 years; and the environment in which my family and I live".

The next three questions addressed perception of public threat and they were preceded by the statement "On a scale from 0 to 7 (where 0 = No risk at all, and 7 = Extreme risk) please indicate the degree of risk you think exists for the following statements", which were "In your opinion, what is the risk of global warming and climate change exerting a significant impact on; public health in Australia?; economic development in Australia?; and the environment in Australia?"

Respondent scores for opinions of personal threat were reversed to reflect the direction of scores for opinions of public threat; and mean scores for public threat were halved to allow comparison with scores for opinions of personal threat. Reliability scores for the items were 0.88 so the two scores were amalgamated and averaged to create one overall score for the variable Opinions of Threat, which was the same approach followed by Kellstedt et al. (2008).

Opinions about the moral aspect of climate change. The question used the same format and scale as used by Koleva et al. (in press) for policy judgements, and to explicitly involve the consequences of the moral stance taken so that self-interest was considered by respondents. This item was preceded by the statement "Which one of the following statements comes closest to your view", and responses were captured by selection of one of the following statements (coded in the following order as 1 to 4):

"Climate change should not be

addressed by our generation";

"Climate change should be addressed by our generation as long as there are no negative consequences for our generation";

"Climate change should be addressed by our generation even if there are some negative consequences for our generation";

"Climate change should be addressed by our generation even if there are significant negative consequences for our generation".

Judgments about the response to climate change. The question and scale of Koleva et al. (in press) was used, but altered to include the expression "and climate change" to better reflect the terminology that is commonly used in public discourse in Australia. No other changes were made except to reflect that one issue was being tested rather than a group of issues. This item was preceded by the statement "The following statements reflect possible policies in response to climate change. Individual opinions on these topics vary widely and there are no 'right' or 'wrong' answers. Which statement about global warming and climate change comes closest to your view?" Responses were captured by selection of one of the following statements (coded in the following order as 1 to 4):

"The government should increase restrictions on emissions from cars and industrial facilities such as power plants and factories in an attempt to reduce the effects of global warming";

"The restrictions currently in place are sufficient to reduce the effects of global warming";

"The government should decrease current restrictions because global warming is a theory that has not yet been proven";

"Don't know".

Judgement scores were reversed to reflect the same direction as moral opinions and opinions of threat; and all "Don't know" responses to this item were excluded from the

analysis.

Political orientation. A self-report rather than an implicit measure of political orientation was used as it has been shown to provide valid responses consistent with implicit measures (Graham et al., 2009). Political Orientation was captured on a seven-point rating scale from “Very Left” to “Very Right”. Whilst other studies have used the labels “liberal” and “conservative”, the labels “left” and “right” have found to be sufficiently clear in countries other than the United States (Van Leeuwen & Park, 2009). This latter type of labelling was necessary in Australia because one of the conservative coalition parties is called the Liberal Party which may have caused confusion for the participants and produced invalid data.

To ensure that the labels were correctly understood, the following statement of definitions drawn from the ideology literature (Jost, Nosek, & Gosling, 2008) was provided:

In the context of politics “Left” means political ideas and beliefs that tend towards progressive social change and equality; whereas “Right” refers to political ideas and beliefs that tend to be conservative and to maintain the status quo and tradition. In Australia, left-wing ideas are often but not exclusively supported by the Greens and the Labor Party; and right-wing ideas are often but not exclusively supported by the Liberal Party and the National Party. We are interested in where you see yourself in the political spectrum.

Moral foundations. These were measured by the Moral Foundations Questionnaire (Graham, Nosek, Haidt, Iyer, Koleva & Ditto, in press) which is a self-report measure, consisting of 2 sections of 16 items each, where 3 items per section measure each of the five moral foundations of Harm/Care, Fairness/Reciprocity, In-group/Loyalty, Authority/Respect and Purity/Sanctity. Participants were asked to rate the sixteen items in the first section according to how relevant they are to

them when making moral judgements, and responses are captured on a six-point scale from “Not at all relevant” = 0 to “Extremely relevant” = 5. An example statement for Authority is “Whether or not an action caused chaos or disorder”. Participants are then asked to rate the sixteen items in the second section according to their agreement with the statements made, and responses are captured on a six-point Likert scale from “Strongly disagree” = 0 to “Strongly agree” = 5. An example statement for Authority is “Respect for authority is something all children need to learn”.

In the moral relevance subscale there is a question about “maths” (altered from “math” to reflect the Australian short form) which is intended to flag those participants not using the bottom end of the scale; and in the moral judgements subscale there is a question about “good” which is intended to flag those participants not using the top end of the scale. The results from the moral relevance subscale and the moral judgements subscale were amalgamated for each of the five foundations as suggested by the developers of the questionnaire (Graham et al., in press).

In order to assess the impact of the specific pattern of scores that are relevant to political orientation and to allow mediation to be tested, an additional variable Progressivism was created as suggested by Van Leeuwen and Park (2009). This score is derived by adding scores for Harm/Care and Fairness/Reciprocity together, then subtracting the scores for In-group/Loyalty, Authority/Respect and Purity/Sanctity. Lower Progressivism scores indicate higher scores on the last three foundations suggesting a more conservative and right-wing political orientation; and higher Progressivism scores indicate lower scores on the last three foundations suggesting a more liberal and left-wing political orientation.

The Moral Foundations Questionnaire

has been found to have high test-retest validity and high external validity against other scales that measure each of the five constructs that underlie the five foundations (Graham et al., in press). Test-retest reliability for the five foundations ranges from 0.68 to 0.82 over an average 37.4 day period (range 28 to 45 days) (Graham et al., in press).

Procedure

The web-based survey was hosted on SurveyMonkey™ and it was designed to ensure that all items were completed and responses were within the possible range of scores for each variable. Internet snowballing was used to obtain the participants. An email was sent to participants known to the researcher which included the link to the survey, with a request that respondents also forward the email to individuals known to them. Ethics approval was obtained from the Ethics Committee of the School of Psychology at Charles Sturt University prior to the dispatch of emails.

Results

Preliminary analysis

A total of 496 people responded to the questionnaire, of which 54 participants failed the two check questions of the Moral Foundations Questionnaire. Their responses were compared to the remainder of the sample and no significant differences were found other than for the responses on the two check questions. Thus instead of automatically dropping these respondents as suggested by Graham et al. (in press), a visual examination of their responses was conducted. Nine participants who demonstrated a uniform pattern of responding suggesting a lack of thought were dropped from the total sample, reducing the final sample size to 487.

Scores for Moral Opinions and Moral Judgements were correlated with each other ($r = 0.56, n = 450, p < 0.001$) and also with Opinions of Threat (Moral Opinions $r = 0.58, n = 487, p < 0.001$ and Moral Judgements $r = 0.60, n = 450, p < 0.001$). Given the high

degree of relationship, we decided to create a single dependent variable labelled Attitude by amalgamating those three scales. Attitude was very negatively skewed indicating a preference for a relatively strong response to climate change, but transformation via a reflect and logarithm procedure (Tabachnick & Fidell, 2007) was successful in normalising the data. A further transformation was performed by multiplying the scores by -1 so that the transformed variable scores reflected the direction of the original scores. For the resulting variable (transformed Attitude), low scores reflect a preference for a reduced response to climate change whereas higher scores reflect a preference for a stronger response.

Descriptive statistics and reliability scores for all variables other than Partisanship are shown in Table 1. Reliability scores for the moral foundations variables differed little from those found by Graham et al. (in press) when developing the Moral Foundations Questionnaire. Whilst the reliability scores are lower than 0.75 for all but Purity/Sanctity, these were considered adequate by Graham et al. (in press) because only six items are used for each foundation, and the same approach has been taken in this study.

An initial analysis was conducted to see whether gender and age were related to any variables of interest and an Independent Samples *t*-test indicated that women in this sample showed greater concern than males for Harm/Care and Fairness/Reciprocity, were more progressive and politically orientated more to the left than men. Effect sizes (manually calculated eta squared using $t^2/(t^2 - N - 2)$, Pallant, 2007) were small except for Harm/Care which was moderate. Consequently, gender was controlled in all further analysis in order to prevent confounding. Age was also found to correlate with a number of the variables. However, age and gender were related, and partial correlations showed that once gender was

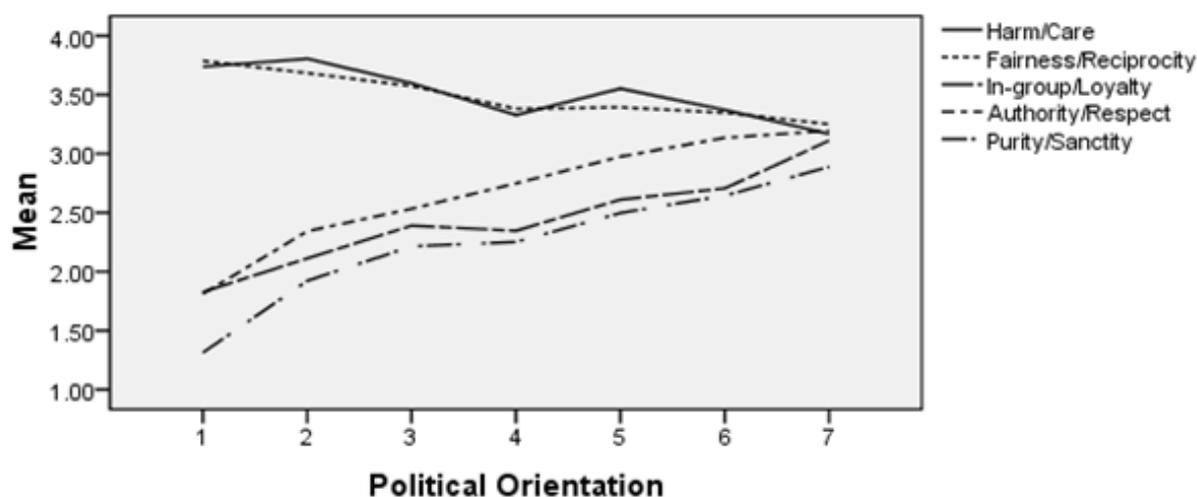


Figure 1: Relationship between moral foundations and political orientation

controlled for there was no relation between age and any of the variables of interest.

Hypothesis Testing

The pattern of moral intuitions scores showed clear differences in the relative importance of the five moral foundations as individual political orientation shifted across the spectrum from left to right as can be seen in Figure 1. This finding is very similar to that of other studies (Haidt & Joseph, 2008, Graham et al., 2009, and Haidt et al., 2009) in that individuals who had a more right-wing political orientation focussed more on In-group/Loyalty, Authority/Respect and Purity/Sanctity than did individuals with a more left-wing political orientation.

Partial correlations controlling for gender were calculated to investigate the relationships between transformed Attitude scores, and the five moral foundations scores, Progressivism scores, and Political Orientation scores, and these are shown in Table 1. Positive partial correlations with transformed Attitude scores were found for Harm/Care, Fairness/Reciprocity, and Progressivism indicating a preference for a stronger response to climate change. Conversely, negative partial correlations were found with In-group/Loyalty, Authority/Respect, and Purity/Sanctity for transformed

Attitude suggesting a preference for a less strong response to climate change for those who place importance on these three moral foundations. Negative partial correlations were found for Political Orientation and transformed Attitude scores indicating that a left-wing political orientation is associated with a preference for a stronger response to climate change, whereas a right-wing political orientation is associated with a less strong response to climate change.

To further explore the relationships indicated by the partial correlations and to specifically test the ability of moral foundation and Political Orientation scores to predict transformed Attitude scores, two standard multiple regression analyses were conducted. The results of these analyses including effect sizes (manually calculated as $f^2 = R^2 / (1 - R^2)$, Cohen, 1988) are shown in Table 2. Separate models were required for the five individual moral foundations scores and for the Progressivism scores because the latter is derived from the five individual moral foundations scores, and hence there would have been a problem with multicollinearity. Model A found that the five moral foundations scores and Political Orientation scores accounted for 26.6% of the total variance in transformed attitude

Table 1
Partial Correlations Controlling for Gender and Descriptive Statistics

	Transformed Attitude	Political Orientation	Harm/Care	Fairness/Reciprocity	In-group/Loyalty	Authority/Respect	Purity/Sanctity
Political Orientation	-0.43**	-					
Harm/Care	0.22**	-0.16**	-				
Fairness/Reciprocity	0.24**	-0.18**	0.56**	-			
In-group/Loyalty	-0.18**	0.26**	0.27**	0.21**	-		
Authority/Respect	-0.21**	0.36**	0.13*	0.13*	0.67**	-	
Purity/Sanctity	-0.15**	0.28**	0.29**	0.22**	0.59**	0.64**	-
Progressivism	0.37**	-0.45**	0.35**	0.39**	-0.63**	-0.73**	-0.63**
Mean	-0.56	3.52	3.56	3.51	2.35	2.62	2.19
SD	0.26	1.49	0.80	0.68	0.92	0.92	1.11
Cronbach's α	0.73		0.64	0.64	0.74	0.74	0.82
Progressivism	Mean = 1.14, SD = 0.93						

Note. ** $p \leq 0.001$ * $p \leq 0.01$

scores ($F(7,442) = 22.92, p < 0.001$). Squared partial coefficients for the statistically significant predictors indicated that the largest unique contribution made to the explained variance in transformed Attitude scores was Political Orientation (11.02%), but that Harm/Care, Fairness/Reciprocity and In-group/Loyalty scores also made unique contributions totalling 4.79%.

Model B investigated the relationship between the combined moral foundation variable Progressivism and Political Orientation scores on the transformed Attitude variable. This second model accounted for 24.2% of the variance ($F(3,446) = 48.90, p < 0.001$). In this case Political Orientation again accounted for the largest amount of variance, and the Progressivism score accounted for a similar amount of variance as the individual moral foundations scores included in Model A.

The results for the two regression analyses suggest that Political Orientation and both three of the individual foundations (Harm/Care, Fairness/Reciprocity and In-group/Loyalty) and a combination of the foundations (Progressivism) uniquely contribute to the variance in transformed Attitude scores.

The Progressivism variable was used

as it includes all of the moral foundations scores, and most importantly it captures the pattern of relative weightings placed on the five moral foundations where relatively low scores on the In-group/Loyalty, Authority/Respect and Purity/Sanctity foundations correlate to left-wing political orientation, and relatively high scores on these foundations correlate to a right-wing political orientation. In order to test whether the relationship between Progressivism scores and transformed Attitude to climate change was mediated by Political Orientation, the Baron and Kenny (1986) method was followed. First, three separate standard linear regressions controlling for gender were performed to calculate direct effects between each of the variables. The results of these regression analyses are illustrated in Figure 2. Increasing levels of Progressivism predicted a preference for a stronger response to climate change. Progressivism was inversely related to Political Orientation, such that increasing levels of Progressivism predicted a more liberal and left-wing political orientation. Political Orientation was inversely related to transformed Attitude, such that increasing conservative and right-wing political orientation predicted a preference for a lesser response to climate change.

Table 2
Predictors of Attitudes

Variable	Model A					Model B				
	Beta	<i>t</i>	Sig.	Partial Correlation	Unique Contribution to Variance%	Beta	<i>t</i>	Sig.	Partial Correlation	Unique Contribution to Variance%
Political Orientation	-0.344	-7.388	0.000	-0.332	11.02%	-0.337	7.213	0.000	-0.323	10.43%
Harm/Care	0.165	3.023	0.003	0.142	2.02%					
Fairness/Reciprocity	0.127	2.460	0.014	0.116	1.35%					
In-group/Loyalty	-0.146	-2.511	0.012	-0.119	1.42%					
Authority/respect	0.002	0.028	0.977	0.001	0.00%					
Purity/Sanctity	-0.043	-0.741	0.459	-0.035	0.12%					
Progressivism						0.225	4.808	0.000	0.222	4.93%
<i>R</i> ²	0.266					<i>R</i> ² 0.242				
<i>F</i>	22.915					<i>F</i> 48.904				
<i>f</i> ²	0.36					<i>f</i> ² 0.32				

The final step of the mediational analysis was to perform a hierarchical multiple regression controlling for gender and introducing first Progressivism and then Political Orientation to see whether the strength of the relationship between Progressivism scores and transformed Attitude scores would be reduced by the introduction into the model of Political orientation scores. As shown in Figure 2, the regression weight dropped from 0.38 to 0.23, and the coefficient was significant ($t = 4.81, p < 0.001$) indicating that there was still a direct effect. The decrease in the regression weight however suggests that there was partial mediation. In order to test for this, the Sobel test (Howell, 2002) was used. A significant indirect relationship between Progressivism and transformed Attitude was found ($t = 7.50, p < 0.001$), indicating that the relationship between Progressivism and transformed Attitude was partially mediated by political orientation.

Discussion

The main aim of this study was to see whether attitudes to climate change would be better predicted by moral intuitions than by political orientation, and whether political orientation would mediate the relationship between moral intuitions and attitudes to

climate change. The focus was confined to the moral and political aspects of individuals' views because, whilst it is acknowledged that economic and scientific information is also relevant to proposed responses to climate change, the selected response will be determined through political processes which must reflect majority public opinion. The study extended earlier work on Moral Foundations Theory by Koleva et al. (in press) and Van Leeuwen and Park (2009) by applying the model specifically to climate change, and extended the work of Zahran et al. (2006) and Kellstedt et al. (2008) by including a broader set of variables.

The results of the study show that attitudes to climate change reflected both individuals' moral intuitions and their self-reported political orientation. Individuals' moral considerations also appeared to be of general relevance to their political orientation. Of the five moral foundations, regression analysis showed that the significant predictors of attitude towards climate change were Harm/Care, Fairness/Reciprocity, and In-group/Loyalty. Whilst these intuitions were each found to uniquely contribute to the explained variance in attitudes to climate change, together their contribution was approximately half that of political orientation. Together the five

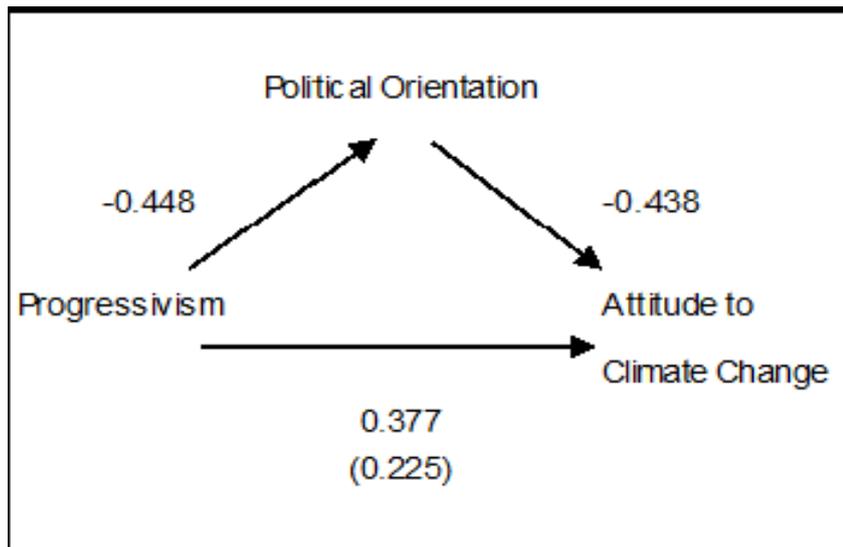


Figure 2. Direct and indirect effects.

individual moral foundations and political orientation accounted for a quarter of the variance in attitude, which indicates that both moral foundations and political orientation appear to be important predictors of attitudes to climate change.

Returning to the specific foundations which yielded significant results, the finding that moral intuitions about Harm/Care predicted a preference for a greater response to climate change is consistent with the findings of Koleva et al. (in press). This result is unsurprising because the issue concerns the welfare of the planet and the impact on future generations and thus considerations relating to Harm/Care are likely to be directly relevant. Similarly, the positive relationship between Fairness/Reciprocity and attitudes to climate change may reflect a recognition of a duty to ensure future generations are not unfairly burdened with damage due to present actions.

Moral intuitions about In-group/Loyalty predicted the opposite attitude to climate change, in that those who placed high importance on this moral foundation did not support as strong a response to climate change as those who placed little importance on this moral foundation. This result may suggest that taking action which reduces economic prosperity and lifestyles relative to

other countries is a key element of attitudes to climate change. When interpreted at the level of agreement between countries, this reluctance to take action on climate change may reflect a preference for the national interest over the common global interest. It may also reflect a concern to protect the economic interests of future generations of one's own country. Again, this is not unexpected given that the decision to subordinate self-interest in favour of the common good is central to the moral dilemma presented by climate change.

A further point arises from the finding that attitudes to climate change in this Australian study appear to be predicted by moral intuitions about Harm/Care, Fairness/Reciprocity, and In-group/Loyalty only rather than by all five foundations. This supports the findings of Koleva et al. (in press) that particular issues appear to elicit focus on some foundations more than others. They found that Purity/Sanctity tended to be the most significant predictor of all of the moral foundations of attitudes to the various issues raised overall (such as abortion, same-sex marriage and gambling), but that other individual foundations were predictive for different issues. They found for example, that Harm/Care was most predictive for the issues of animal testing and death penalty, but In-

group/Loyalty was most predictive for defence spending. For global warming the only intuitions that Koleva et al. (in press) found to be predictive of attitudes were Purity/Sanctity and Harm/Care.

Another aspect of these findings is the specific differences in the findings themselves between this study and the Koleva et al. (in press) study. Whilst the relative importance of Purity/Sanctity in each of the studies is quite different, it is unclear whether there are differences involving the extent of religious belief between Americans included in the Koleva et al. (in press) study and the Australians in this study. Another difference was that the Koleva study found no predictive relationship for Fairness/Reciprocity or for In-group/Loyalty. Cultural differences are unable to be discerned as the sample in the Australia study was not random, but a further study using a random sample of Australians may be able to shed light on it. Taken together however, these findings in the context of climate change do provide further empirical support for the relevance of Moral Foundations Theory to moral decision-making in general, and important additional information about how the moral intuitions may operate in practice for the particular issue of climate change.

Central to the current study was the expectation that political orientation would be associated with patterns of relative weightings that individuals' place on the moral foundations of In-group/Loyalty, Authority/Respect, and Purity/Sanctity, and this was found to be the case. As political orientation moved further across the left-right spectrum from liberal to conservative, the relevance to the individual of these three foundations rose to similar levels as for Harm/Care and Fairness/Reciprocity. This finding replicates the results of other studies (Haidt & Joseph, 2008; Graham et al., 2009; Haidt et al., 2009) supporting the link between moral intuitions and political orientation. The Progressivism variable was created to simplify into one

variable the different pattern of relevance to individuals' of the five individual foundations. It represents the difference between focus mainly on Harm/Care and Fairness/ Reciprocity and a more even focus on all of the five moral foundations. As anticipated, Progressivism was found to positively correlate with a left-wing political orientation and to negatively correlate to a right-wing political orientation.

Progressivism was expected to predict a preference for a stronger response to climate change, and this was found to be case. Both political orientation and progressivism made unique contributions to the explained variance in regression analyses of attitudes to climate change and together accounted for a quarter of the variance. Again the contribution of political orientation was approximately double that of the pattern of moral foundation scores encapsulated by progressivism. Both regression models involved political orientation and moral foundations, and though the latter variables were used in different ways the results were very similar. Together the models indicate the importance of both the moral foundations and political orientation as predictors of attitudes to climate change.

The finding of unique contributions to explained variance for both moral foundations (individually and combined as Progressivism) and political orientation is similar to that of Koleva, et al. (in press) who found that moral foundations made unique contributions to the variance in moral opinions and moral judgements when political orientation was included in the analyses. The finding that political orientation predicted attitudes to climate change also replicated the findings of Kellstedt et al. (2008) and Zahran et al. (2006).

The findings of the hierarchical regression analysis confirmed that the mediation was partial rather than full, as depicted in Figure 2. Effect sizes for the

components of the indirect relationship which comprised the relationship between progressivism and political orientation, and thence the relationship between political orientation and attitude to climate change were medium. Similarly the effect size for the direct relationship between progressivism and attitudes to climate change was also medium. These findings mean that whilst the impact of progressivism on attitude to climate change is partially mediated by political orientation, it also has a direct relationship with attitudes to climate change. Additionally the relationships were not only statistically significant but indicate that the differences in attitudes found were of practical significance to the way individuals may respond to climate change.

The negative skew of attitude indicated a majority preference for strong action on climate change. This was not the case in the United States studies by Zahran et al. (2006), Kellstedt et al. (2008), or Koleva et al. (in press) which may suggest that the attitudes to climate change of the Australian participants in this study are different to those of the American participants on these other studies. Specifically, the Australians in this study appear to be more positive towards action on climate change irrespective of other variables, but replication of this research utilising finer scales which would allow a greater spread of responses would be able to explore this more fully. It may be that climate change is more salient to the Australians in this study because of the relatively harsh climate compared to other countries, or they may be better informed about the issue than they were at the time of the Brechin (2003) study of knowledge about the cause of global warming. Inclusion of measures of individual's knowledge about the causes and likely consequence of climate change in future research would assist in clarifying the relationship between attitudes to climate change and objective knowledge about climate change and would extend the work of Zahran et al. (2006).

As noted earlier, it is also possible that this result is due to the fact that this was not a random sample. Though a relatively high proportion of non-capital city dwellers were included, it was very much a Sydney-based sample and Sydney residents may be wealthier, better-educated and more environmentally-aware than the 'typical' Australian. Accordingly, the attitudes to climate change found may not be generalisable beyond this study. Similarly the snowballing technique used may have led to the inclusion of participants who have a strong interest in climate change and a preference for strong action through their agreement to participate and also because the friends and acquaintances they may have forwarded the survey to might be like minded. Nevertheless, this study does not purport to be a representation of typical Australian attitudes to climate change but rather a study of the interplay of moral intuitions and political ideology. By using an Australian sample, however, this study makes an important contribution to the existing body of scholarship in respect of Moral Foundations Theory because it tested the robustness of the model in a culture outside of the United States.

The relationship between attitudes about climate change and specific moral foundations has implications for the public debate about the response to climate change. At the very least, the relationships found between the pattern of moral foundations and political orientation may provide the opportunity for increased understanding of the positions of each side of the debate on the basis of individuals' deep moral concerns. Understanding opposing positions such that the underlying issues can be addressed may be an important step towards consensus. Specifically concerns related to Harm/Care and Fairness/Reciprocity appear to be shared by the Australians in this study irrespective of political orientation. The differences in attitudes to climate change appear to be related to the relative importance placed on In-group/Loyalty however which is also reflected in political orientation itself along

with Authority/Respect and Purity/Sanctity. This suggests that the debate over the response to climate change may be improved if issues are framed so as to acknowledge all of the relevant perspectives, particularly the moral foundations elicited by the issue of response to climate change. The partial mediation found in this study suggests that individuals' attitudes are grounded in something more than that which follows from political orientation alone, so the debate must also explore how all salient moral foundations can be addressed, if political solutions are to reflect people's moral views and not just political partisanship.

While the results of the present study show a relationship between moral foundations and attitudes to climate change, it is not possible to say whether the inclusion of moral foundations concerns in the debate will alter attitudes to climate change. This study is a cross-sectional correlational study, and hence the causal relationships between moral intuitions and political choices cannot be identified. Longitudinal studies will be required to investigate those. From the perspective of psychology generally, new aspects of morality and moral decision-making are worthy of further research if moral psychology is to be of great utility in this era of polarised political perspectives (Jost, 2006).

The relevance of public opinion and thus political action in response to climate change remains high as international efforts to determine mutually agreed measures are still in progress. This study contributes to our understanding of which aspects of morality are salient to individuals in respect of climate change, and suggests that together moral foundations and political ideology will influence attitudes about the response to climate change. It is hoped that this work may shed some light on the key predictors of public attitudes to the response to climate change and contribute a small step towards establishing a better understanding of factors

relevant to opposing viewpoints. It has also contributed to the growing body of scholarship concerning Moral Foundations Theory.

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Address correspondence to

Sharon Dawson
sldawson@bigpond.com