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Personal Norms for Dealing with Climate Change: Results from a Survey Using Moral Foundations Theory

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ABSTRACT

Climate change has become one of the main issues in environmental and sustainability discussions during the last decade. Acting to reduce climate change can be viewed as a prosocial behavior, and previous research has found that personal norms are important in explaining these types of behaviors, together with other attitudinal factors. In this study we use Moral Foundations Theory (MFT) to explore the antecedents of personal climate change norms together with three attitudinal factors: problem awareness, social norms and adherence to the New Ecological Paradigm. Analyzing data from a nationwide survey ($N = 1086$) conducted in Sweden, we find that the moral foundations concerning harm and fairness are positively associated with personal climate change norms, whereas authority has a negative relation. However, the moral foundations from MFT contribute less in explaining personal climate change norms compared with the attitudinal factors included in the study. Theoretical and empirical implications are discussed. © 2015 The Authors Sustainable Development published by ERP Environment and John Wiley & Sons Ltd

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Introduction

DURING THE LAST FEW DECADES THE SUSTAINABILITY CHALLENGES AND ENVIRONMENTAL PROBLEMS FACING HUMANKIND and planet Earth have become widely recognized (Mostafa, 2013; Young *et al.*, 2010). For example, it has been argued that three out of nine planetary boundaries for a safe operating space for humankind have already been crossed (Rockström *et al.*, 2009), including biodiversity loss, the nitrogen cycle and climate change. According to the Intergovernmental Panel on Climate Change (IPCC) report of 2013, the concentration of greenhouse gases in the atmosphere has increased to levels unprecedented on Earth during the last 800 000 years, and the human influence on the climate system is undisputed. Scientists, governments and international bodies such

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as the UN are worried about these developments, as are many citizens. According to a recent survey by the Pew Research Center (2013) conducted on citizens in 39 countries, global climate change was found to be considered the top global threat. Similarly, a recent Gallup (2014) poll found that 58% of Americans expressed a great deal or fair amount of worry about global warming. However, while it is extremely likely (95–100% probability) that human influence was the dominant cause of global warming between 1951 and 2010 (IPCC, 2013) this recognition has rarely carried over into substantial action with positive results. In fact, many trends today do not point in the direction of sustainable development and it remains a question why many people feel little inclination to take action to prevent further climate change.

Climate change is an issue that knows no national borders, putting international negotiations and agreements in focus as solutions. However, in order to formulate and implement climate mitigation and adaptation policies, understanding how individuals relate to climate change is of utmost importance. As with many sustainability issues in general, there is a tension between individual and collective gains and losses when dealing with climate change behaviors. As such, climate change can be conceptualized as a social dilemma where beneficial actions at the individual level are in conflict with societal level consequences of these actions (Capstick, 2013). If all individuals act to increase their own benefits, the society in total will be at a loss. Solutions at the individual level therefore require prosocial behavior, where the good of society is put before individual benefits (Lozano, 2007). Along these lines, several debaters and philosophers argue that a precondition for mitigating climate change is for it to be treated as a moral issue, where individual benefits of inaction in the short term should be sacrificed for the common good in the long term (Brown *et al.*, 2006; Gardiner, 2011; Singer, 2006). The focus of this paper is on this issue of how individuals relate to climate change in moral terms.

Traditional Western notions of morality build on the distinction of preventing harm to others and promoting fairness and justice (Gilligan, 1982; Kohlberg, 1981). Yet it has been argued that this is a limited view of morality (Haidt and Graham, 2007; Haidt, 2001, 2007). Thus, in Moral Foundations Theory (MFT) the harm and fairness principles are complemented with three additional notions of morality, concerning group loyalty, authority and purity. In addition, moral judgments are considered to be intuitive reactions rather than cognitive assessments of consequences. The MFT has mostly been used to understand political convictions (see, e.g., Graham *et al.*, 2009; Koleva *et al.*, 2012) and only a few studies relate it to the issue of climate change (Dawson and Tyson, 2012; Koleva *et al.*, 2012). From an environmental psychology perspective, on the other hand, it is well established that personal norms (defined as feelings of moral obligations; Schwartz, 1977) influence both intentions and actual prosocial/proenvironmental behavior (Manstead, 2000; Thøgersen, 2006). From this research it is also evident that these personal norms are influenced by other attitudinal factors, such as problem awareness, social norms and adherence to an ecological worldview (Biel and Thøgersen, 2007; Dunlap *et al.*, 2000; Nordlund and Garvill, 2003).

Based on the developing notions of MFT and the attention to personal norms in the environmental psychology literature, the main purpose of this paper is to analyze how the moral foundations from MFT are linked to personal norms. A secondary purpose is to relate MFT to attitudinal factors previously found important for understanding prosocial behavior. The contribution of this research is an integration of perspectives and thus a better understanding of which factors are related and contribute in explaining personal norms for taking prosocial action. This type of understanding is arguably important for conceiving policies to solve social dilemma issues (see, e.g., Capstick, 2013) such as climate change. Furthermore, by using a Swedish sample for testing the MFT, an important addition is made to the ongoing scholarly discussion regarding the cross-cultural validity of the theory.

In this paper, we first present the MFT and then the role of personal norms and other attitudinal factors included in the study (problem awareness, social norms, and adherence to an ecological worldview) for proenvironmental behaviors. After describing how the empirical data were gathered in a questionnaire survey, we present the results, draw conclusions and discuss implications.

Literature Review and Previous Research

Moral Foundations Theory

Moral Foundations Theory (MFT) has been emerging the last few years as a response to classic notions of morality consisting of values concerning mainly harm and fairness. According to Graham *et al.* (2011), this development is in

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part a reflection of the dominance of Lawrence Kohlberg's (1981) ideas about morality as justice and his subsequent debate with Carol Gilligan (1982) about her alternative conception of morality as care. Both sides agreed that morality was about how well or poorly individuals treated other individuals (Graham *et al.*, 2011). Based on conceptual development and empirical studies, Haidt and Kesebir (2010, p. 800) proposed an alternative approach that defines moral systems by their function: 'Moral systems are interlocking sets of values, virtues, norms, practices, identities, institutions, technologies, and evolved psychological mechanisms that work together to suppress or regulate selfishness and make social life possible'. Contrasting with a rationalistic view of morality such as that by Kohlberg, the MFT assumes that judgments are based on emotional, automatic and cognitive appraisals, referred to as intuitions. These intuitions influence moral decision-making through a psychological preparedness to attend to and approve or disapprove of particular aspects of situations or issues prior to any conscious reasoning process (Haidt and Graham, 2007; Haidt, 2001).

The Five Moral Foundations

The MFT has as such been developed to include five moral foundations (including the classic two), based on an understanding of evolutionary and cultural development across cultures and over time: care/harm, fairness/cheating, loyalty/betrayal, authority/subversion and sanctity/degradation (Haidt and Graham, 2007; Haidt, 2007). In the following we use the first word of each foundation to describe them.

According to MFT the care foundation relates to our long evolution as mammals with attachment systems and an ability to feel (and dislike) the pain of others, and can be related to Gilligan's notion of care as the primary focus of morality (Gilligan, 1982). The care foundation was initially triggered by the will to minimize the suffering for our own children. It underlies virtues of kindness, gentleness and nurturance, and invokes feelings of compassion and empathy (Haidt, 2012). The second foundation, fairness, is related to the evolutionary process of cooperation and selfishness. It generates ideas of fairness, justice and rights and is close to Kohlberg's original ideas of morality (Kohlberg, 1981). Being treated fairly in cooperation generates feelings of pleasure, liking and friendship (Haidt, 2012). The next foundation, loyalty, is related to humankind's long history as tribal creatures able to form coalitions with others but also reject those individuals who betray the group (Haidt, 2012). It underlies virtues of patriotism and self-sacrifice for the group. The fourth foundation, authority, is shaped by humankind's long primate history of hierarchical social interactions. It underlies virtues of leadership and followership, including respect for legitimate authority and deference to traditions. According to Haidt (2012, p. 120), the authority foundation is triggered by anything that is construed as an act of obedience, disobedience, respect, disrespect, submission or rebellion with regard to authorities perceived to be legitimate. It also carries over onto dis/respect for institutions, traditions and values that are perceived to provide stability. Finally, the last foundation, sanctity (which has also been called purity in some studies, e.g., Koleva *et al.*, 2012), was shaped by the psychology of disgust and contamination. It underlies religious notions of striving to live in an elevated, less carnal, more noble way and the widespread idea that the body is a temple, which can be desecrated by immoral activities and contaminants (Haidt, 2012). Haidt also argues that the sanctity foundation underlies some of the moral passions of the environmental movement, since these, implicitly or explicitly, argue that pollution and industrialization degrade the purity of nature.

To date the majority of studies utilizing MFT have related the foundations to political self-reported affiliation. For example, using the MFT it has been found that liberals (political left) consistently show greater endorsement and use of the care and fairness foundations compared with the other three foundations, whereas conservatives (political right) endorsed the five foundations more equally (Graham *et al.*, 2009). In this study, we are more interested in examining the relations of the five foundations to a specific issue (climate change) than to general political attitudes.

Moral Foundations and Climate Change

Only a few studies have dealt with environmental issues in general and climate change in particular in the context of MFT. In an Australian study Dawson and Tyson (2012) found that care and fairness intuitions were predictive of preference for stronger responses to climate change by politicians, whereas those with higher loyalty scores showed a preference for a reduced response. In addition, they found that the five moral foundations were less predictive of stronger response to climate change than self-reported political affiliation (Dawson and Tyson, 2012). This signifies that moral foundations are not the only predictors of attitudes towards issues such as climate change, but likely interact with other attitudinal constructs as well. In this study we use this notion and compare three types of attitudinal factors with MFT, discussed further below.

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In another study, where the main focus was not primarily on climate change but on culture wars, Koleva *et al.* (2012) found that care, fairness and sanctity (called purity in this study) were significantly related to support for tougher measures on global warming. This was interpreted to imply that intuitions about care extend to the planet as well as to future generations and that nature is held sacred for these individuals (Koleva *et al.*, 2012). The questions on global warming were related to perceptions on governmental measures against global warming (and not personal responsibility), which again relates these issues to the political arena rather than to the personal domain.

In a study on advertising appeals, Kidwell *et al.* (2013) also provided insights into moral foundations and sustainability behaviors such as recycling. In the study it was found that conservatives, who favor loyalty, authority, and sanctity for moral judgments, tended to adhere to the social norms of their group and strive for a high degree of self-control and a strong sense of duty (called a binding foundation). Liberals, who favored caring and fairness, tended to act based on their inner feelings about moral behavior with specific regard to individual rights and welfare (called an individualizing foundation). Kidwell *et al.* (2013) draw the conclusion that appealing to the specific moral foundations of liberals and conservatives significantly enhanced recycling behavior and spilled over to related sustainable behaviors of acquisition (compact fluorescent light bulbs) and usage (water conservation). The study by Kidwell *et al.* (2013) is important in highlighting the connection between moral foundations and social norms and also how messages can be tailored to fit with moral foundations.

The studies reviewed above indicate that the moral foundations are related to sustainability attitudes and behaviors in different ways. Since the findings are to some extent contradictory to each other, it is not possible to formulate specific hypotheses on how adherence to specific moral foundations relates to climate change personal norms. However, based on the previous discussion it can be hypothesized that adherence to care and fairness foundations will be positively related to personal climate change norms. However, none of the studies address personal norms as an antecedent to (prosocial) behavior, which makes the hypothesized relation interesting to examine. From an environmental psychology perspective, when focusing on prosocial behaviors, norms have been found to be powerful explanatory factors of intentions and behaviors in a number of contexts (Eriksson *et al.*, 2008; Jansson, 2011; Wiidegren, 1998). Since climate change has been argued to be a social dilemma (see, e.g., Capstick, 2013) and since morality is about how individuals relate to each other, it becomes important to relate MFT to personal norms and examine how these interact with other attitudinal factors in order to clarify relationships in the sustainability domain.

Moral Norms and Attitudinal Factors

It is well established that personal norms (feelings of moral obligations) influence both intentions for prosocial behavior and actual behavior (Biel and Thøgersen, 2007; Manstead, 2000; Thøgersen, 2006). Norms are shared beliefs about how individuals perceive they ought to act, which are enforced by the internalized threat of sanctions or the promise of rewards (Schwartz, 1977; Stern *et al.*, 1999). Personal norms have been defined by Schwartz (1977) as a self-expectation of specific action in a particular situation, experienced as a feeling of moral obligation. Thus, personal norms are adhered to for internal reasons consistent with internal values, conceptions of right and wrong, good or bad (Thøgersen, 2006). Less internalized norms are commonly referred to as social norms. Rather than following internalized expectations, following social norms is based on perceived group expectations for reward and punishment. It is assumed that individuals adhere to social norms because of (objective or subjective) social pressure (Ajzen and Fishbein, 2005; Thøgersen, 2006). Social norms are perceived as shared by members of a subgroup, and they vary to some extent from one individual to another in how internalized they are. Thus, personal norms arise or are learned from shared expectations in social interaction, they are modified in the singular interaction history of each person and they represent ideals against which events are evaluated (Schwartz, 1977). Social norms are thus closely related to personal norms but are conceptualized as antecedent to forming personal norms.

A wealth of studies show positive correlations between personal norms and proenvironmental behavior, such as recycling (Thøgersen, 2003; Vining and Ebreo, 1992), minimizing or switching travel choices to more environmentally friendly alternatives (Bamberg *et al.*, 2007; Jansson *et al.*, 2011; Nordlund and Garvill, 2003), consumer purchase behaviors of less environmental harmful products/packaging (Thøgersen, 1999) and organic food/wine (Thøgersen, 2002), acceptability of energy policies (Steg *et al.*, 2005) and also political action (Stern *et al.*, 1999).

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Concerning social norms, there is also evidence of correlations between these and different types of behavior such as conservation behavior (Goldstein *et al.*, 2008), car use (Bamberg and Schmidt, 2003) and travel mode choice (Hunecke *et al.*, 2001). Correlations between social norms and behavior are generally weaker and become significantly weaker or disappear when personal norms are added to these models (Biel and Thøgersen, 2007; Thøgersen, 2006). Thus, internalized personal norms are more effective in explaining prosocial behavior than perceived external social norms, due to their lesser level of internalization. This makes personal norms particularly interesting to study, since they are conceptualized as the last attitudinal factor influencing behavior. This has been established in the value–belief–norm theory (VBN) developed by Stern and colleagues (Stern *et al.*, 1999; Stern, 2000), partly based on the norm activation model (NAM) developed by Schwartz (1977).

In the VBN theory, personal norms are related to other attitudinal factors such as values and beliefs. In the VBN theory this is done by incorporating awareness of problems, aspects of responsibility and adherence to an ecological worldview (often referred to as the New Ecological Paradigm; NEP) as antecedents to personal norms. The NEP has been described as a 'folk' ecological theory, from which beliefs about the adverse consequences of environmental changes can be deduced (Dunlap *et al.*, 2000; Stern, 2000). Although adherence to the NEP has been found valuable in explaining variations in norms and behavior in several studies (Jansson *et al.*, 2011; Steg *et al.*, 2005), the relationship between worldviews and actual behavior has in general not been found to be strong (Poortinga *et al.*, 2004; Schultz, 2001). This may be due to the fact that more behavior-specific attitudinal factors mediate the relationship between worldviews and behavior (Ajzen and Fishbein, 1974; Nordlund and Garvill, 2003). It therefore becomes important to also take specific attitudinal factors into account when exploring the antecedents to climate change personal norms. One such important antecedent has been found to be problem awareness (Grob, 1995; Nordlund and Garvill, 2003; Stern, 2000). Problem awareness is manifested at different levels of specificity in relation to the problem or issue at hand, and is a prerequisite for environmental attitudes and norms to develop. In their study on willingness to reduce car use, Nordlund and Garvill (2003) found that general problem awareness showed positive effects on specific problem awareness, and specific problem awareness influenced the personal norm to reduce car use positively.

Grounded in the research reviewed above, we expect that the moral foundations of MFT, problem awareness, social norms and adherence to the NEP are related to personal climate change norms to different degrees. As such, we expect that the three attitudinal constructs are related to higher levels of personal climate change norms, and we explore whether the five moral foundations in the MFT are related to climate change personal norms.

Methodology

To analyze how the five moral foundations specified in MFT are related to personal climate change norms, a survey was conducted in Sweden. Conducting the study in Sweden could provide important insights, since Sweden ranked highest on a set of sustainable development indicators among the EU countries in a recent study (Grzebyk and Stec, 2015). Data were collected using a postal mail-in respondent self-administered questionnaire. The questionnaire was sent to 5000 individuals randomly drawn from the Swedish population register (SPAR), which lists all Swedes resident in Sweden. A number of surveys did not reach the recipients due to change of address (59). After one reminder with an additional enclosed questionnaire a total of 1144 questionnaires were returned (response rate: 23.2%). When entering data, 58 questionnaires were found to be either close to blank or filled out to less than 50%. These were removed from further analysis, leaving 1086 questionnaires to analyze.

The sample consisted of 51% females and the mean age was 51.9 (minimum 17 and maximum 79, $N = 1{,}013$). Concerning education, income and number of children in the household, the sample was deemed representative of the Swedish adult population.

Measures

The questionnaire, which was part of a larger survey, consisted of an introduction letter and seven pages of questions covering environmental issues, climate change, attitudinal factors and sociodemographics.

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The five moral foundations were measured using the 30 item Moral Foundations Questionnaire (MFQ), available at www.moralfoundations.org in different languages and used in several previous studies (Graham *et al.*, 2011, 2009). The scale measures moral relevance and moral judgment, with 15 items each. Six items assessed each of the five foundations (care, fairness, loyalty, authority, sanctity) on a scale ranging from 0 (not at all relevant/strongly disagree) to 5 (extremely relevant/strongly agree). Means, standard deviations and Cronbach's alpha values are presented in Table 1 for all constructs.

In the MFQ, two items are included to screen out respondents who do not use the full scale. After examination, 69 questionnaires were thus removed from further analysis due to either non-response on these items or unreliable answers. The standardized Cronbach's alpha values for the five foundations ranged from acceptable to good (0.575 to 0.766) and are comparable to those of previous studies in English (e.g. Dawson and Tyson, 2012; Graham *et al.*, 2011). This indicates the reliability of the MFQ in Swedish as well.

The dependent construct personal norm tapped into personal norms concerning climate change and was measured using nine items on a scale from 1 (strongly disagree) to 5 (strongly agree), partly based on the work of Stern *et al.* (1999). After scale refinement two items were removed, resulting in a Cronbach's alpha of 0.906.

The problem awareness construct measured climate change problem awareness and was measured using six items on the same scale as personal norm; the items were partly based on the work of Nordlund and Garvill (2003) used in Swedish before. Two items were removed after scale refinement (Cronbach's alpha = 0.896).

Social norm was measured to be related to environmental and climate change using five items on the same five point scale as previous measures. These items were partly based the work of on Biel and Thøgersen (2007). One item was removed after refinement, resulting in a Cronbach's alpha of 0.875.

In order to clarify the dimensionality of the attitudinal constructs, all items used for personal norms, problem awareness and social norms were entered into a principal components analysis (PCA). The results after Varimax rotation are presented in Table 2, together with the wording and means of items and scales. A total of 70.6% of the variance was explained, and the consistency of the measures and the orthogonality of the factors were thus confirmed.

Last in the questionnaire, a short version of the NEP scale, measuring adherence to an ecological worldview, was included, utilizing eight items from 1 (strongly disagree) to 5 (strongly agree) based on the original scale (see, e.g., Dunlap *et al.*, 2000). The NEP scale achieved a Cronbach's alpha of 0.831.

Results

To investigate the relations between personal norms, moral foundations and the other factors, several analyses were carried out. First correlations between constructs were analyzed, and thereafter four multiple regression analyses were run, using personal norm as the dependent construct.

Construct	Items	Min–max	Mean	Std dev.	*N*	Cronbach's α
Moral intuitions						
Care	6	0–5	3.62	0.73	1017	0.575
Fairness	6	0–5	3.48	0.73	1017	0.655
Loyalty	6	0–5	2.78	0.80	1017	0.652
Authority	6	0–5	2.63	0.87	1017	0.686
Sanctity	6	0–5	1.95	1.01	1017	0.766
Attitudinal factors						
Personal norm	7	1–5	3.51	0.88	1013	0.906
Problem awareness	4	1–5	4.09	0.88	1014	0.896
Social norm	4	1–5	2.62	0.93	1011	0.875
NEP	8	1–5	3.76	0.70	1012	0.831

Table 1. Scale descriptive statistics

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First, our results pertaining to MFT (presented in Table 1) show that, among the moral foundations, care is rated the highest ($M = 3.62$) and sanctity the lowest ($M = 1.95$). All means are significantly different from each other ($p < 0.001$). Studying the means of the other factors, it is notable that the respondents exhibit higher levels of problem awareness ($M = 4.09$) and adherence to the NEP ($M = 3.76$) than personal norm ($M = 3.51$), and that social norms ($M = 2.52$) for climate change, on average, are rated the lowest of these constructs (all differences statistically significant, $p < 0.001$).

The correlation analysis of the constructs (presented in Table 3) shows that the care and fairness foundations are significantly correlated with each other and all other measured constructs ($p < 0.001$). Furthermore, loyalty is significantly correlated with all constructs except the NEP. Authority is significantly correlated with sanctity, and sanctity in turn is significantly correlated with problem awareness and personal norm. Problem awareness is correlated with social norm, NEP and personal norm.

In order to analyze the contribution of the moral foundations and other factors to explain variation in personal norms, the five foundations were entered into a regression with personal norm as dependent construct, presented in the upper part of Table 4. This regression (Model 1 – moral foundations, $N = 970$, $F = 36.97$, $p < 0.001$) shows that care, fairness and authority contribute significantly in explaining personal norm. Care contributes the most ($\beta = 0.233$, $T = 6.19$, $p < 0.001$), followed by fairness ($\beta = 0.210$, $T = 5.65$, $p < 0.001$). Authority shows a significant negative relationship with personal norm ($\beta = -0.154$, $T = -3.60$, $p < 0.001$). Loyalty and sanctity are not significant contributors to the model. The R square for the model is 0.147.

	Mean	SD	Component			Comm.
			1	2	3	
Personal norm	3.51	0.88				
I think it is important to have my climate impact in mind in my everyday behaviors.	3.79	1.05	0.730			0.687
I have a moral responsibility to take climate change into consideration.	3.94	0.99	0.722			0.717
I have a moral obligation to buy climate friendly products when shopping.	3.44	1.10	0.731			0.690
I feel a personal responsibility for global warming.	2.92	1.19	0.690			0.600
Not only governments and industry are responsible for climate change, I am as well.	3.72	1.13	0.750			0.646
It feels good for the conscience to act in a climate smart way.	3.72	1.09	0.702			0.656
I get a bad conscience when not acting in a climate smart way.	3.04	1.19	0.704			0.602
Problem awareness	4.09	0.88				
Global warming is a problem for society.	4.26	0.99		0.749		0.723
Climate change is the most serious environmental problem facing the world.	3.91	1.08		0.808		0.736
Climate change is a serious problem for the entire society.	4.06	0.99		0.842		0.840
Climate change is a serious problem for animals and plants.	4.12	0.98		0.817		0.767
Social norm	2.62	0.93				
People who are important to me think that I should buy climate friendly products.	2.68	1.15			0.828	0.748
People around me think that I should do as much as possible to protect the environment.	2.72	1.11			0.860	0.796
I see many people around me who actively act in a climate friendly way.	2.70	1.02			0.774	0.672
I think that many people who mean a lot to me expect me to reduce my climate impact.	2.35	1.09			0.827	0.707
Percentage of variance explained			21.97	28.10	20.53	

Table 2. Construct measures and scale reliability for personal norm, problem awareness and social norm
Scale: 1, strongly disagree, to, 5, strongly agree.
Principal component analysis, Varimax rotation with Kaiser normalization, loadings less than 0.45 not shown.
Total variance explained = 70.6%; Bartlett's test Chi-sq. = 9499.37, df = 105, $p = 0.000$, $N = 970$.
SD, standard deviation; Comm., communality.

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	Care	Fairness	Loyalty	Authority	Sanctity	PA	SN	NEP
Fairness	0.604**							
Loyalty	0.414**	0.373**						
Authority	0.243**	0.157**	0.633**					
Sanctity	0.309**	0.256**	0.564**	0.654**				
PA: problem awareness	0.315**	0.332**	0.090**	0.009	0.066*			
SN: social norm	0.217**	0.238**	0.170**	0.037	0.153**	0.312**		
NEP	0.313**	0.281**	0.043	−0.013	−0.001	0.618**	0.219**	
PN: personal norm	0.330**	0.332**	0.085**	−0.044	0.066*	0.689**	0.500**	0.562**

Table 3. Construct correlations
Pearson correlation coefficients.
**Correlation is significant at the 0.01 level (two tailed).
*Correlation is significant at the 0.05 level (two tailed).
N = 1012–1017.

	β	T	Sig.
Model 1. Moral foundations			
Care	0.233	6.19	0.000
Fairness	0.210	5.65	0.000
Loyalty	−0.020	−0.48	0.630
Authority	−0.154	−3.60	0.000
Sanctity	0.052	1.29	0.199
F	36.97		0.000
R^2	0.147		
Model 2. Attitudinal factors			
Problem awareness	0.464	17.54	0.000
Social norm	0.307	14.42	0.000
NEP	0.208	8.07	0.000
F	477.19		0.000
R^2	0.587		
Model 3. Composite			
Care	0.070	2.61	0.009
Fairness	0.025	0.96	0.337
Loyalty	−0.013	−0.46	0.646
Authority	−0.085	−2.84	0.005
Sanctity	0.029	1.04	0.298
Problem awareness	0.448	16.82	0.000
Social norm	0.296	13.68	0.000
NEP	0.191	7.32	0.000
F	185.20		0.000
R^2	0.597		
R^2 change from Model 1	0.450		0.000
R^2 change from Model 2	0.010		0.000

Table 4. Regression analyses with personal norm as dependent variable
n = 970.

In the next regression (Model 2 – Attitudinal factors – in Table 4), personal norm was regressed on the three attitudinal constructs (N = 970, F = 477.19, $p < 0.001$). This showed that all three constructs (problem awareness, social norms and NEP) significantly influenced personal norm, and that problem awareness contributed the most

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($\beta = 0.464$, $T = 17.54$, $p < 0.001$). It is also notable that the R square (0.587) is well above that of the previous regression with the five moral foundations.

In the third regression (Model 3 – composite – in Table 4), the five moral foundations and the three attitudinal constructs were entered together (Table 4, $N = 970$, $F = 185.20$, $p < 0.001$). This analysis shows that care (which is significant only at the $p < 0.01$-level) and authority ($p = 0.005$) are significant contributors, together with problem awareness, social norm and the NEP (all $p < 0.001$). It is notable that problem awareness, social norm and the NEP contribute significantly more than the MFT constructs in the model. The R square of Model 3 is 0.597, which is a significant increase with 0.010 ($p < 0.001$) compared to Model 2.

In the last regression (Model 4 – full – in Table 5), all constructs were entered together with sociodemographic factors as controls ($N = 970$, $F = 106.05$, $p < 0.001$). The regression shows that none of the five moral foundations are significant ($\beta = -0.074$, $T = -2.46$, $p = 0.014$). As in Model 3, problem awareness, social norm and NEP all contribute positively. Among the control variables, being female is significantly related to personal norm, as is having more education. However these effects (β values) are small compared with the other factors. The model achieves an R square of 0.611, which compared with Model 3 is a significant increase (0.014, $p < 0.000$).

To conclude, the results show that, although the moral foundations of care, fairness and authority contribute in explaining personal norms for climate change, these effects disappear or become smaller when mainly attitudinal, but also sociodemographic, factors are included in the analysis.

Discussion of Findings

The main purpose of this paper was to analyze how the moral foundations from MFT are linked to personal climate change norms, since earlier research has shown that personal norms are important for taking action in a prosocial direction. A secondary purpose was to relate MFT to attitudinal factors in order to understand which of these factors are related, and contribute more to explaining personal norms for taking action on climate change. Below we deliberate on the findings in relation to the purposes.

	β	T	Sig.
Model 4. Full			
Care	0.049	1.71	0.088
Fairness	0.028	1.05	0.292
Loyalty	0.008	0.27	0.784
Authority	−0.074	−2.46	0.014
Sanctity	0.055	1.87	0.061
Problem awareness	0.443	16.18	0.000
Social norm	0.300	13.58	0.000
NEP	0.180	6.71	0.000
Gender (1, female; 2, male)	−0.076	−3.43	0.001
Age	−0.050	−1.95	0.051
Education	0.051	2.22	0.027
Children	0.032	1.35	0.176
Living status (1, cohabitating)	0.010	0.42	0.673
Income	0.018	0.77	0.444
F	106.05		0.000
R^2	0.611		
R^2 change from Model 3	0.014		0.000

Table 5. Full regression model with personal norm as dependent variable
$N = 970$.

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Moral Foundations and Personal Climate Change Norms

Studying the descriptives of the MFT, it can be noted that the means of the five moral foundations are similar to those in previously published studies conducted in English (Dawson and Tyson, 2012; Graham *et al.*, 2011), confirming the founders' claimed cross-cultural validity of the MFT. Furthermore, the results showed that MFT does contribute significantly in explaining personal climate change norms. Thus, our study contributes in that it shows that these foundations influence personal norms, which many studies have found to be powerful predictors of prosocial behavior (e.g. Bamberg *et al.*, 2007; Jansson *et al.*, 2011). In detail, the foundations of care and fairness contribute positively to personal norms for climate change, and these results are in line with the study by Dawson and Tyson (2012), who studied personal preferences for stronger political responses to climate change in Australia. The results are also similar to those by Koleva *et al.* (2012), who, among other things, studied approval for tougher political measures on global warming and found that care and sanctity were predictive of global warming attitudes. Based on these three studies, evidence is thus mounting that individuals with moral intuitions strongly influenced by the care and fairness foundations exhibit both greater attitudes and personal norms towards dealing with climate change. This might be explained by the fact that climate change is perceived as something hurting other people among individuals with strong climate change personal norms. It might also stretch to how climate change impacts animals, since one of the items in the MFQ is focused on hurting an innocent animal. In addition, climate change is related to ideas of fairness, justice and rights, and our results might be interpreted such that among individuals with strong personal climate change norms it is viewed as unfair that some groups are contributing more to causing climate change whereas others contribute less, or, as Dawson and Tyson (2012) argue, that it is perceived as unfair that current generations are harming the welfare of future generations.

However, whereas Dawson and Tyson (2012) found that adherence to the loyalty foundation meant preference for a reduced response to climate change, we did not find such a relation. Instead, we found that the authority foundation had a significant negative effect on personal climate change norms. We explain our results by suggesting that individuals with stronger climate change personal norms believe to a lesser extent in authoritarian guidance, hierarchies and traditions. It might be that individuals with higher personal climate change norms are more open for change and not as bound by traditions as individuals with lower levels of these norms. This would be in line with previous research that has found that openness to change is a strong predictor of proenvironmental behavior (Karp, 1996). This might also be related to the fact that climate change is a relatively new issue for many people, and that authorities have been slow and ambiguous in taking climate mitigation and adaptation actions. It also suggests that climate change norms cannot be commanded by authority figures, but instead need to develop in non-hierarchical social interaction, which is discussed in the literature concerning how personal norms develop (e.g. Thøgersen, 2006).

Furthermore, Koleva *et al.* (2012) found that adherence to the sanctity foundation was related to tougher measures on climate change, whereas we did not find such an effect. This is also contrary to what Haidt (2012) argues when claiming that ideas of sanctity/purity underlie the environmental movement in viewing nature as sacred. One explanation for the differences between our results and theirs may be that our study focused on personal norms (felt moral obligations) specifically, and that Koleva *et al.* (2012) focused on attitudes toward what the respondents thought the government should or should not do. Thus, their respondents might have been more open to shifting responsibility to others, such as authoritarian figures, for solving the problems, thus making the relationship stronger. Another explanation might be that Sweden is one of the most secularized nations in the world (Inglehart and Welzel, 2010), and at the same time has a population that ranks high on post-materialism values and environmental awareness (Inglehart, 1995; Mostafa, 2013), cautioning against conclusions that are too far reaching regarding these relations in a cross-cultural perspective. Studying the MFQ items concerning sanctity (see Graham *et al.*, 2011), it can also be noted that some of the items come with religious connotations that might invoke other associations than what many Swedes would perceive sanctity/purity to be, given the high degree of secularism. Thus the sanctity foundation receives the overall lowest mean among the foundations. This carries implications for how MFT and the measurement questionnaire can be developed in more secularized cultures, discussed further below.

Overall, pertaining to the main purpose of the study, our findings that personal climate change norms are explained by the moral foundations of care, fairness and authority (negative), but not by loyalty and sanctity, together

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with the studies by Dawson and Tyson (2012) and Koleva *et al.* (2012), imply that care is the most cross-culturally significant predictor of climate change attitudes and norms. Further studies need to clarify to what extent the other relations found can be cross culturally validated.

Attitudinal Factors and MFT

The secondary purpose of this study concerned how environmental and climate change attitudinal factors related to MFT. Concerning attitudinal constructs that were operationalized as problem awareness, social norm and NEP in this study, it was found that problem awareness was higher than both personal norms and social norms for climate change. The results also showed that there was a considerable gap between felt social norms for climate change and internalized personal norms. This might be explained by the fact that climate change has received less attention in the general debate in Sweden during the last few years since the spike from 2007 to 2009 (see, e.g., Harring *et al.*, 2011) and is thus less discussed in social contexts, although personal norms still exist. As Thøgersen and Zhou (2012) point out regarding the purchases of organic food, when there are few role models and individuals are faced with fewer expectations, social norms play a lesser role for proenvironmental behavior. However, the felt personal moral obligation to take action was higher in our study, signifying that the motivation to act on the issue is driven more by internal motivation than external. It was also found that all three attitudinal constructs were predictive of climate change personal norms, as expected based on previous studies (e.g. Biel and Thøgersen, 2007; Nordlund and Garvill, 2003; Steg *et al.*, 2005). The contribution of our study in this regard is that, when the impacts of these factors are compared with the MFT, the attitudinal constructs show significantly higher predictive power in the regressions. The effects of care, fairness and authority foundations disappear when the attitudinal factors are entered together with the sociodemographic controls. This is explained by the fact that the attitudinal constructs capture some of the variance in the moral foundations. However, it also shows that attitudinal factors are better predictors concerning climate change than the more general moral foundations from MFT. An explanation for this is that the moral foundations are general across many issues (such as climate change), whereas the attitudinal constructs measured are more specifically geared towards personal climate change norms. This is comparable to the principle of compatibility, where measuring the attitudes and the behavior at the same level of specificity can maximize the predictive power of attitudes (Ajzen and Fishbein, 1977). Another explanation is that climate change has been argued to be an abstract issue, where cognitive deliberation is necessary in order to understand causes and consequences (see, e.g., Markowitz and Shariff, 2012). This is likely to make the issue of climate change less connected to the intuitive judgments that rely on the moral foundations of MFT and more related to specific attitudes.

Sociodemographic Factors

Although sociodemographic variables are usually found to have a low explanatory power for intentions for and actual prosocial behavior (see, e.g., Diamantopoulos *et al.*, 2003; Jansson *et al.*, 2011), we used them as controls in this study. It was found that being female and having a higher education was related to stronger climate change personal norms. This is in line with several previous studies using sociodemographics to explain prosocial/proenvironmental behaviors and attitudes (Laroche *et al.*, 2001; Straughan and Roberts, 1999). Regarding females, theoretical justification comes from the argument that women, based on sex role differences and social development, deliberate on their impact on others and the environment to a higher extent than men (Eagly, 1987, as cited by Straughan and Roberts, 1999). Recently, it was also found that girls had higher levels of appreciation for sustainability issues than boys (Svetina *et al.*, 2013). In this regard it can be argued that the morality of care that Gilligan (1982) put forth extends from caring for other humans to the environment and thus climate change as well.

To conclude, our study provides further evidence for the strong impact of attitudinal factors on the formation of personal norms, in this case for climate change. Moreover, our study contributes by showing that there are linkages between the care, fairness and authority foundations and personal climate change norms, although they are weaker than the attitudinal influences. The influences from sociodemographic factors on personal climate change norms are weak but significant. As such, our study signifies the intrinsic motivation for action in the prosocial domain, which has been argued to be a longer lasting influence than extrinsic motivators (Dobson, 2007; Young *et al.*, 2010). These results carry implications for sustainable development practice and theory in general, and for

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understanding public attitudes and personal moral norms related to climate change in particular, which we discuss further below.

Implications and Conclusions

Much of the everyday debate in sustainable development and climate change tends to focus on scientific, economic or political issues. According to Singer (2006), issues concerning ethics have been largely neglected. However, one of the most used definitions of sustainable development (i.e. that of the Brundtland report, WCED, 1987) brings up the link between present and future generations, making the issue an ethical tradeoff. That the public does not view sustainable development and/or climate change as (a) moral issue/s might be related to several aspects of these complicated problems, such as abstractness, complexity, unintentionality, uncertainty and remoteness in time and space (Gardiner, 2011; Markowitz and Shariff, 2012). Traditionally, morality has been understood as actions caring for and preventing harm to others, and promoting fairness and justice. In the context of climate change this would mean that people would not harm the climate, since they see that this also harms others. People would also understand that it is unfair and unjust that some individuals can take advantage of emitting greenhouse gases while others have to suffer the consequences of these emissions. Our study shows that these traditional notions of morality, or what is termed care and fairness in the MFT literature (Graham *et al.*, 2011), are indeed related to personal moral norms for mitigating climate change. Thus a conclusion of our study is that care and fairness are important moral foundations with which climate change personal norms are strongly correlated. This signifies that individuals see aspects of climate change in care and fairness terms and that these norms might have developed out of these moral foundations, since moral foundations can be assumed to be more stable than personal climate change norms.

Our study also shows that authority is significantly negatively related to climate change norms and that loyalty and sanctity are not significant indicators. However, when we add three attitudinal factors (problem awareness, social norm, ecological worldview) the only foundation still significant is authority. One overarching implication of these results is that climate change is not viewed as a moral issue when using MFT as a way to measure morality when controlling for other attitudinal factors. The other specific attitudes are better at explaining personal climate change norms. Since attitudes are conceptualized as more volatile and changeable than individual beliefs about morality, it can be argued that climate change as an issue in the public's eye has yet to move from a superficially treated concept to one that is based on full moral insight. The question becomes how this can be achieved. Since previous research concerning MFT has found that there is a difference between how conservatives (binding foundations) and liberals (individualizing foundations) adhere to the moral foundations and also that they relate to climate change differently (Dawson and Tyson, 2012; Koleva *et al.*, 2012), it has been suggested that when climate change is communicated it should rely on all moral foundations, rather than only emphasizing the care and fairness foundations (see, e.g., Markowitz and Shariff, 2012). Kidwell *et al.* (2013) also show that messages tailor-made to fit with the binding and individualizing foundations are more effective in increasing recycling intentions. Together with the results of our study, this implies that the foundations of authority, loyalty and sanctity should be more emphasized in climate change communication and discussions. This would mean that larger parts of the population are engaged and would be able to contribute with important insights into how climate change policy and actions could be developed.

For this study the MFQ (Graham *et al.*, 2011) was used in order to assess adherence to the five moral foundations in the MFT on a generalizable sample in Sweden. Although the mean values and reliability indicators are similar to those of to previously published studies, there are items in the scale that might be less suitable in a secularized and highly environmentally aware culture such as the Swedish (Inglehart and Welzel, 2010; Inglehart, 1995). For example, concerning loyalty and sanctity it could be argued that the wording of items might invoke other associations in Sweden than in other countries. As a case in point, two of the loyalty items draw on pride and love for one's country. Considering the recent heated debate in Sweden concerning nationalism and hostile attitudes towards immigrants among some minority groups, these items might not capture loyalty as reliably in Sweden as in other countries. Similarly, two sanctity items draw on religion and chastity, which are concepts related to other sentiments than what can be expected in Sweden concerning sanctity and purity. Thus an implication from conducting the study in Sweden might be that the items concerning loyalty and sanctity would need to be adjusted. A suggestion might

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be to reformulate the sanctity foundation so that it in fact also includes items concerning (violations of) the natural environment. However, the overall conclusion is that the MFQ is in most aspects a reliable measure in a generalizable sample in Sweden.

Limitations and Further Research

In this study we show that the MFT (see, e.g., Graham *et al.*, 2011) is relevant for understanding personal climate change norms and that these general foundations also are related to commonly used attitudinal constructs relating to the issue at hand. This is done using a nationwide representative sample establishing the cross-cultural validity of the moral foundations for Sweden. In spite of this, there are several limitations to our study. For example, we cannot rule out the possibility of self-selection bias in the method although the response rate was relatively high and we used a paper–pencil survey in order to make it available to all respondents regardless of internet accessibility. Moreover, it is a cross-sectional, correlational study, precluding us from drawing conclusions on in what direction the relations found develop. Further research could utilize longitudinal methods in order to overcome this limitation. Further on, with this study, together with others (Dawson and Tyson, 2012; Koleva *et al.*, 2012), there is now mounting evidence of the connection between MFT and prosocial/environmental issues such as climate change. However, there are some interesting differences in utilized related constructs and results, as accounted for above. In order to substantiate whether these difference are study related or actual, more studies in the researched countries, and others, are necessary using different types of samples and preferably nationally representative ones. As this study was conducted in a highly secular and environmentally aware society, it would also be valuable to compare these results to similar countries in Scandinavia and northern Europe to substantiate whether the evidenced relations hold in these societies as well. It would also be useful to adjust the wording of some of the items in the MFQ to see whether it would produce different results, especially concerning the loyalty and sanctity foundations. In any case, further examining the relationships between MFT and other attitudinal constructs, but also prosocial behavior in general, is an important theoretical as well as empirical endeavor. Considering the sustainability challenges facing us, sustainability is perhaps the most important area in which the MFT can be utilized.

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