



American evangelicals and global warming



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ABSTRACT

American evangelicals have long played a significant role in American culture and politics. Drawing from a nationally representative survey, this article describes American evangelicals' global warming risk assessments and policy preferences and tests several theory-based factors hypothesized to influence their views. American evangelicals are less likely than non-evangelicals to believe that global warming is happening, caused mostly by human activities, and causing serious harm, yet a majority of evangelicals are concerned about climate change and support a range of climate change and energy related policies. Multiple regression analyses found that the combination of biospheric, altruistic, and egoistic value orientations is a more significant predictor of evangelicals' risk assessments and policy support than negative affect, egalitarian or individualistic worldviews, or socio-demographic variables.

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1. Introduction

Christianity and modern environmentalism have often had a troubled relationship. In 1967, historian Lynn White argued that the Judeo-Christian worldview was a root cause of the Western world's destructive relationship with nature. Specifically, he argued that the Old Testament book of Genesis had long been interpreted as giving humanity the right to dominate nature and exploit its resources for human use (White, 1967). His article sparked a heated controversy that continues to this day, including extended theological debates over whether "dominion" means domination or stewardship, and numerous research studies that have examined the relationship between religion, environmental concern, and behavior (Djupe and Hunt, 2009). The results of these investigations have been mixed. Several studies have found that some types of religious belief (e.g. conservative eschatology or 'End of Times' thinking) are associated with lower levels of environmental concern (Hand and Van Liere, 1984; Eckberg and Blocker, 1989; Guth et al., 1995). Others, however, have found that the belief in God or identification with particular religions is not or only weakly associated with measures of environmental concern (Boyd, 1999; Hayes and Marangudakis, 2000, 2001).

Yet other studies have found that individuals who attend church more often are more likely to engage in environmentally protective behavior (Kanagy and Willits, 1993; Woodrum and Wolkomir, 1997). Still other studies have found that biblical literalism is associated with greater concern about environmental impacts on humans, but less concern about environmental impacts on plants and animals (Schultz et al., 2000). Finally, some scholars argue that organized religions have fundamentally shaped human cultural and ethical values around the world (Kaplan, 2010). Faith communities thus have the unique ability to construct moral frameworks that can encourage human beings to protect the Earth (Tucker, 2003). Evangelicals are one such group. National surveys have found that between 25 and 30% of the American public consider themselves 'born again' or evangelical Christians (Pew, 2008; Gallup, 2005). Their political profile is mixed, although majorities identify with the Republican Party and have a conservative political ideology (Pew, 2008). In turn, evangelical organizations and opinion leaders have had a significant influence on American public discourse and government policies for many years (Wills, 1991; Kohut et al., 2000). Layman and Hussey (2007), for example, argue that evangelicals were of significant importance for the election and re-election of President George W. Bush. Often voting in large numbers, evangelicals have tended to support politically conservative candidates whose political beliefs (including pro death penalty, anti gun control, anti gay marriage, etc.) resonate with their own (Wilcox, 2000).

The present study explores how the American evangelical community engages with the issue of global warming. More specifically, how evangelicals perceive the risks of global warming,

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whether they support or oppose climate change and energy policies, and what factors influence their views. Given the socio-political influence evangelicals have in contemporary American society, it is important to know how the community engages with global warming, particularly as the issue has become increasingly politicized in recent years (Dunlap and McCright, 2008).

American evangelicals have engaged a broad range of environmental issues for many years (Kearns, 1996, 1997; Shibley and Wiggins, 1997), but only recently have they turned their attention to global warming. A number of evangelical leaders have argued that anthropogenic climate change is a fundamental moral and ethical issue that must be addressed by people of faith. In 2002, a University of Oxford forum facilitated discussions among prominent climatologists and members of the US National Association of Evangelicals. This event, combined with subsequent meetings and discussions, led to the Evangelical Climate Initiative and its 'Call to Action' plan for dealing with the global warming challenge (ECI, 2006).

This 'Call to Action' outlines how evangelicals should engage with global warming. First and foremost is acceptance of the anthropogenic causes of global warming, followed by an acknowledgment that the consequences will be severe and will hit the poorest areas of the world the hardest (ECI, 2006). A campaign to engage the American evangelical community followed the publication of the Call to Action, and numerous advertisements appeared in major American newspapers urging efforts to combat the crisis. Using the tagline 'Our commitment to Jesus Christ compels us to solve the global warming crisis' these advertisements argued that evangelicals have a duty and responsibility to protect the planet. Other initiatives developed to promote environmental stewardship and evangelical engagement with global warming include The Evangelical Environmental Network, 'Restoring Eden' Christians for Environmental Stewardship, and the Youth Evangelical Climate Initiative.

This perceived sense of duty and responsibility to protect the planet draws directly from the moral conviction among some evangelicals that human beings are called to protect God's creation (Kearns, 1997; Hayhoe and Farley, 2009; Moore and Nelson, 2010). They argue that not only do humans have a responsibility to look after the Earth, as they are dependent on its resources for survival, but that there is also a moral imperative to do what is right, as instructed by God. Often drawing upon a stewardship interpretation of the word "dominion" in the book of Genesis, these evangelicals argue that Christians have a moral responsibility to protect God's creation (Kearns, 1997; Robinson, 2010).

Wilkinson (2010, 2012) and Wardekker et al. (2009) examined the moral narratives American evangelicals have used as they engage with the issue of global warming. They identified two key moral themes in evangelical thought and literature: 'creation care' and 'neighbor care'. 'Creation care' emphasizes environmental stewardship and the responsibility humans have to look after God's creation, while 'neighbor care' focuses on the importance of caring for one's neighbor, especially the poor, sick, and vulnerable. Some evangelical leaders have drawn upon both of these biblical imperatives to develop their response to global warming, arguing that climate change is likely to have severe impacts on both humans and non-human nature, and especially on the world's poor, who are often the most vulnerable to changes in the climate.

Recent qualitative research has also documented various 'opinion drivers' for how evangelicals understand global warming. Wilkinson (2010, 2012) asked respondents from nine evangelical churches in the southeastern United States to read the ECI's "Call to Action". Focus group discussions were then conducted to explore their opinions in greater depth. She found that although tenets of the creation and neighbor care themes resonated with evangelical churchgoers, the topic of global warming also generated polarized

views. More specifically, lay evangelicals in these focus groups tended to be much more skeptical of climate change science and the potential consequences than the leaders who had signed the ECI. This research also found that distrust of scientists and a conservative political ideology were important factors. These findings are in line with other research that demarcates evangelical beliefs along political lines. For example, McCammack (2007) describes the difference between liberal and conservative evangelical environmentalists. Liberal evangelicals broadly accept that global warming is occurring and accept a biblical mandate to take action to protect God's creation, while conservative evangelicals doubt global warming science and support policies which protect the economy rather than the environment.

These prior studies, however, have been based either on limited qualitative data or analysis of key texts. But how do American evangelicals as a group perceive global warming? What policies do they support or oppose? To what extent do they accept the arguments being made by some evangelical leaders that climate change is a serious moral and religious issue? Very little survey research has investigated how evangelicals respond to this issue. A few results from public opinion polls have found that evangelicals are less likely than the national average to believe that global warming has an anthropogenic basis (Pew, 2009). Furthermore, evangelicals have also been found to be less likely to believe that the federal government should do more to mitigate the threat (Public Religion Research Institute, 2009). This paper describes American evangelicals' global warming risk assessments and policy preferences, and tests several theoretically derived predictors of their views – the roles of affect, cultural worldviews and environmental value orientations.

1.1. Risk as analysis vs. risk as feeling: the importance of affect

How individuals understand and process risk information centers around two fundamental yet distinct approaches. The 'risk as analysis' paradigm emphasizes the use of cognitive deliberation and analytic processing of risk, whereas the 'risk as feelings' approach is experiential, arguing that people are often more reliant upon affect and emotion when making risk judgments and decisions (Slovic and Peters, 2006; Finucane, 2008). Treating response to risk as primarily cognitive, traditional risk perception and mental model studies have identified the various heuristics and biases individuals use to process and understand risk information. Knowledge, or rather the lack of knowledge, for example has been used to account for important misconceptions public have about climate change, among other risk issues (Kempton, 1991; Bostrom et al., 1994; O'Connor et al., 1999).

More recent research has focused on the role of "affect", or the emotional quality of 'good' or 'bad' associated with different risks (Slovic et al., 2002). This research has found that people draw upon both affect and emotional cues to process information and make decisions about risk. Affect is processed quickly, automatically, and efficiently and enables people to make daily decisions with relatively little cognitive effort. As such, affect helps to guide perceptions of risk and benefit. Individuals are often motivated to engage in activities that produce positive and pleasant feelings, but also to avoid activities that produce negative and unpleasant feelings. Empirical support for this 'affective heuristic' is growing and has been used to explore public risk perceptions for a range of issues (e.g. Finucane et al., 2000).

Researchers have also investigated the affective dimensions of public risk perceptions of global warming, using affective imagery analysis. "Imagery" here refers to mental representations or cognitive content within the individual mind and can include both perceptual and symbolic representations (Damasio, 1999). "Affective imagery" is therefore defined as "sights, sounds, smells, ideas,

and words, to which positive and negative affect or feeling states have become attached through learning and experience” (Slovic et al., 1998, p. 3).

Affective imagery analysis uses a structured form of word association in order to identify the mental representations and feelings people spontaneously associate with particular risks, hazards, or target terms (Szalay and Deese, 1978). Leiserowitz (2006), and more recently Smith and Leiserowitz (2012) for example, found a range of images for global warming including associations with melting ice, increases in heat and skepticism. Moreover these images were stronger predictors of global warming risk perceptions and policy preferences than a range of other sociodemographic and political variables. These, and other studies, provide evidence of the important role affect and affective imagery play in judgment and decision-making processes of risk issues.

1.2. Cultural theory

Cultural theory explores the role of underlying worldviews in public responses to risk (Douglas and Wildavsky, 1982; Douglas, 1992). Worldviews and their ‘orienting dispositions’ guide how the public process risk information (Dake, 1991, 1992; Dake and Wildavsky, 1990, 1991). According to the theory, “worldviews are mediated by social relations; an individual is either more group-oriented or individual-oriented. Likewise, an individual believes that many socially stratified rules are needed to control behavior, or that few rules are necessary” (Leiserowitz, 2006, p. 49). Different combinations of these two dimensions result in a four-cell operationalization of cultural ‘worldviews’. These ideal types (hierarchists, egalitarians, individualists and fatalists) represent culturally biased ‘ways of life’ predisposing those located within each to view risk in a particular and predictable manner. Hazards tend to be seen as risky or not and policies supported or opposed depending on one’s worldview (Dake, 1991; Peters and Slovic, 1996). These are, however, only ideal types: “This typology is a heuristic device; few individuals should be expected to hold to these extreme positions consistently” (Jaeger et al., 1998, p. 191).

Hierarchists, for example, are group-oriented, prefer strong social rules, and tend to support policies as long as experts govern them. Egalitarians are also group-oriented, prefer fewer social rules, and support democratic and participatory decision making and policies designed to maximize fairness and equality for all. Individualists are individual-oriented, believe few rules are necessary to govern behavior, and typically oppose policies that restrict individual autonomy. Despite being criticized as a narrow and overly simplistic categorisation of risk (Boholm, 1996; Lupton, 1999) empirical research has repeatedly found that egalitarianism and individualism, in particular, are important predictors of public risk perceptions of various hazards, including global warming (Smith and Leiserowitz, 2012; Leiserowitz, 2006), water pollution (Langford et al., 2000), nuclear power (Slovic and Peters, 1998) and nanotechnology (Kahan et al., 2009).

1.3. Value-belief-norm theory

Adapting Schwartz’ norm-activation model of altruism (Schwartz, 1973; Schwartz and Howard, 1981), value-belief-norm theory offers an account of the values underlying environmental concern which helps guide attitudes and behaviors when individuals are faced with environmental risk (Stern et al., 1993; Stern and Dietz, 1994; Stern, 2000). The theory argues that environmental concern is comprised of three value orientations – egoistic, altruistic and biospheric – which influence how an individual responds to adverse consequences threatening objects

they value. Individuals with an egoistic value orientation, for example, might take action or engage in pro-environmental behavior if they feel personally affected by risk whereas someone with an altruistic value orientation might, out of a moral sense of duty, be motivated to protect friends, family or others in their local community from risk. Individuals with a biospheric orientation are driven by the intrinsic value they place in nature and use this as motivation to protect against risk. Analogous to cultural worldviews, these value orientations predispose individuals to perceive and respond to environmental risk in different yet predictable ways. Research has shown biospheric, altruistic and egoistic values are important predictors of a range of issues including willingness to reduce personal car use (Nordlund and Garvill, 2003) and support for energy policies (Steg et al., 2005).

The present investigation explores American evangelicals’ responses to global warming and tests the relative ability of the affect heuristic, cultural theory, and value-belief-norm theory to predict evangelical global risk assessments and policy preferences, with the following research hypotheses:

1. Holistic affect and affective images significantly predict evangelicals’ global warming risk assessments and support for climate policies, with more negative affect correlated with greater risk assessments and policy support.
2. The cultural worldviews of egalitarianism and individualism have a significant and separate influence on evangelicals’ global warming risk assessments and support for climate policies, with egalitarianism correlated with greater risk assessments and policy support and individualism correlated with lower risk assessments and policy support.
3. Biospheric, altruistic and egoistic value orientations (environmental concern) have a significant and separate influence on evangelicals’ global warming risk assessments and support for climate policies.

2. Method

2.1. Respondents and procedure

A nationally representative survey of American public opinion, risk perceptions and policy preferences was conducted between September and November 2008 by Knowledge Networks using their nationally representative online research panel. A total sample of 2164 American adults completed the questionnaire with a within-panel completion rate of 54%. Due to length, the questionnaire was divided into two stages and data collection occurred over a two-week period. Data was weighted to match US Census Bureau population parameters and the margin of sampling error was plus or minus 2%, with 95% confidence. From a total sample of 2164 American adults in the survey, 584 (27%) identified themselves as ‘born again’ or evangelical, 1318 (62%) said they were not, and 230 (11%) said they did not know.

2.2. Measures

2.2.1. Risk assessment

Assessments of global warming risk were measured along three dimensions: (1) the spatial distance of the threat (how much respondents thought global warming would harm them personally, their family, their community, people in the US, people in other industrial countries, people in developing countries, future generations, and other plant and animal species); (2) the temporal distance of the threat (the timing of harm to people in the United States and people around the world); and (3) the likelihood of various impacts (including intense hurricanes, extinctions of plant and animal species, climate change refugees, and disease

epidemics). Other studies using similar measures to assess global warming risk perception include (Leiserowitz, 2006; Akerlof et al., 2010; Smith and Leiserowitz, 2012; Ding et al., 2011). For analysis, a single risk assessment index integrating all three dimensions was constructed ($\alpha = 0.98$; see supplementary material for full questions).

2.2.2. Policy preferences

Respondents were also asked how much they supported or opposed a variety of climate change and energy policies. Policies, similar to those used in other studies (e.g. O'Connor et al., 1999; Leiserowitz, 2006), included support for the regulation of carbon dioxide as a pollutant, a 25-cent per gallon gasoline tax, funding research into renewable energy sources, and establishing a fund to make buildings more energy efficient. For analysis a policy support index was created based on the overall mean response for each policy item ($\alpha = 0.85$; see supplementary material for full questions).

2.2.3. Holistic affect

Holistic affect is often defined as a single, overarching positive or negative evaluation of a stimulus term (Finucane et al., 2003; Slovic and Peters, 2006; Leiserowitz, 2005, 2006). For the present study, respondents were asked to rate whether global warming is a good or a bad thing using a unipolar, 6-point Likert scale ranging from +3 (very good) and –3 (very bad).

2.2.4. Affective imagery

Affective images were collected from all respondents and contain two elements: a cognitive component (the image category) and associated affective rating (a goodness or badness evaluation). Images were collected using an open-ended word association methodology (Szalay and Deese, 1978; Peters and Slovic, 1996) that enables context free associations to emerge naturally in response to a stimulus term. Images were collected by asking respondents to provide the first 'word' or 'phrase' that comes to mind when thinking about global warming. Responses were typically in the form of single word associations (e.g. 'apocalypse') or short narrative statements (e.g. 'the end of the world'). Respondents were asked to rate their own association on a 6-point affect scale (where +3 = a very good thing and –3 = a very bad thing). This procedure produced a rich dataset of images for each survey that were analyzed using a coding frame first developed and tested by the authors in 2002 (Leiserowitz, 2005) and replicated in several national surveys since. Ten percent of the images were double coded to ensure consistency of the coding and the inter-coder agreement was satisfactory (84%). Differences were resolved following discussion between the two coders. The mean affect of each image category was also calculated.

2.2.5. Global warming concern

Global warming concern was operationalized by adapting questions from the Environmental Concern Scale (Schultz, 2000, 2001). Traditionally, this scale contains a range of questions tapping three underlying dimensions of environmental concern (biospheric, altruistic & egoistic value orientations). For the present investigation, each question was modified to reflect levels of concern about global warming along these three dimensions. An exploratory factor analysis found that "global warming concern" was best described as a one-factor rather than a three-factor construct (see supplementary material for further details). For analysis, a global warming concern index was created with a very high reliability score ($\alpha = 0.99$; see supplementary material for full questions). Global warming concern and the risk assessment indices have a few similar items (see supplementary material for individual items) but measure different constructs: global

warming concern measures an affective and emotional reaction to global warming impacts whereas risk assessment is a cognitive judgment of the likelihood, frequency and magnitude of global warming impacts.

2.2.6. Worldviews

The cultural worldviews of egalitarianism and individualism were operationalized using a series of questions derived from Cultural Theory and adapted from scales used by Dake (1991, 1992), Peters and Slovic (1996), Rippl (2002) and Leiserowitz (2006). For analysis, egalitarianism and individualism indices were created, each with a high reliability score (both α 's = 0.76; see supplementary material for full questions).

2.2.7. Socio-demographics

A range of socio-demographic information was also collected as control variables, including gender, age, ethnicity, educational attainment, household income, political ideology (liberal–conservative), political party identification (Democrat, Independent, Republican), and religiosity (frequency of religious service attendance).

3. Results

What is the difference between evangelical and non-evangelical global warming beliefs, attitudes, risk assessments and policy preferences?

3.1. Beliefs and attitudes

American evangelical beliefs and attitudes are presented in Table 1. Compared to non-evangelicals, American evangelicals are less likely to believe global warming is happening ($\chi^2(1) = 63.55$, $p < .001$), less likely to believe human activity is the cause ($\chi^2(1) = 64.77$, $p < .001$), less worried about global warming ($t(1012) = -8.48$, $p < .001$) and less likely to believe that most scientists think global warming is happening ($\chi^2(1) = 32.22$,

Table 1
Evangelical beliefs and attitudes.

	Evangelicals	Non-evangelicals
Do you think global warming is happening?		
Yes	61	78
Do not know	24	14
No	16	8
Assuming global warming is happening, do you think it is ...		
Caused mostly by human activities	44	64
Caused by human activities and natural changes	3	5
Caused mostly by natural changes in the environment	41	29
Neither because global warming is not happening	8	2
Do not know/other	4	1
Perceptions of scientific consensus		
Most scientists think global warming is happening	38	52
Most scientists think global warming is not happening	3	2
There is a lot of disagreement	39	32
Do not know enough to say	20	14
How worried are you about global warming?		
Very worried	12	19
Somewhat worried	37	49
Not very worried	29	22
Not at all worried	22	10

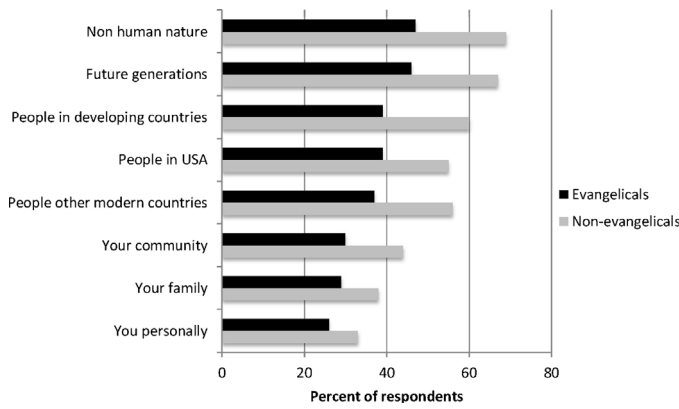


Fig. 1. Evangelical risk assessments.

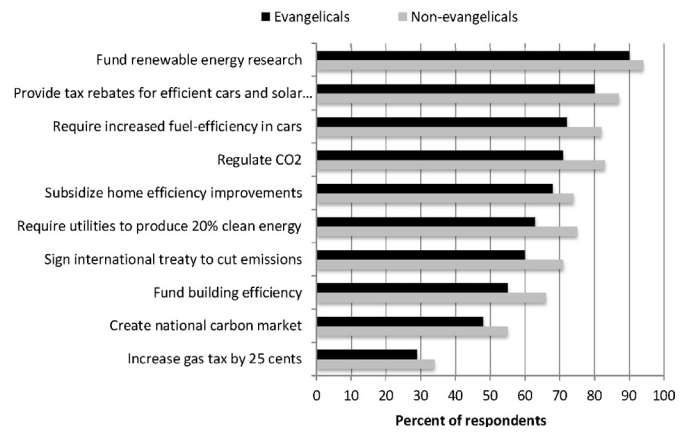


Fig. 2. Evangelical policy preferences.

$p < .001$). Despite these differences, however, 61% of evangelicals believe that global warming is happening, 44% believe that anthropogenic activities were to blame and 49% are either very worried or somewhat worried about the problem.

3.2. Risk assessments

American evangelical and non-evangelical risk assessments are presented in Fig. 1. Bars represent the proportions of each that believe global warming will harm each category of people or nature ‘a moderate amount’ or ‘a great deal’. Compared to non-evangelicals, evangelicals are less likely to believe that global warming will seriously harm non-human nature ($t(1077) = -8.58, p < .001$) future generations ($t(1075) = -8.01, p < .001$), people in developing countries ($t(1890) = -8.87, p < .001$), people in the USA ($t(1086) = -6.46, p < .01$), people in other modern industrialized countries ($t(1893) = -7.53, p < .001$) and their local

community ($t(1891) = -6.51, p < .05$). Evangelicals are less likely than non-evangelicals to believe that global warming will seriously harm their family ($t(1090) = -5.32, p < .001$) or themselves personally ($t(1896) = -4.93, p < .001$).

Nearly half of American evangelicals, however, assess global warming as a threat to non-human nature and future generations of people. Forty-seven percent said that global warming will harm non-human nature and 46% said it will harm future generations of people “a moderate amount” or “a great deal.” Global warming was less likely to be perceived as a risk for local communities (30%), families (29%), or respondents themselves (26%).

3.3. Policy preferences

Compared to non-evangelicals, evangelicals are significantly less likely to support all policy measures designed to mitigate

Table 2
Evangelical risk assessment multiple regression.

Independent variables	Model 1 Affect	Model 2 Images	Model 3 Worldviews	Model 4 Sociodems	Model 5 Full
Holistic affect	0.26***				0.22***
Image affect	-0.01				0.00
Global warming concern	0.61***				0.49***
Icemelt		0.03			-0.02
Nature		0.04			0.05
Alarmed		0.10**			0.00
Flood/sea		0.10**			0.03
Naysayer		-0.52***			-0.18**
Politics		-0.20***			-0.07*
Weather		0.07*			0.07*
Egalitarianism			0.37***		-0.04
Individualism			-0.20**		0.01
Gender				0.18***	0.07*
Household income				-0.12**	-0.07*
Political ideology				0.18***	-0.01
Party ID				0.26***	0.11**
Religiosity				-0.07	-0.02
Race/ethnicity				-0.01	0.07*
Education (4 Cat)				-0.06	0.00
F	240.59***	41.97***	91.03***	24.44***	46.00***
Adjusted R ²	0.59	0.36	0.26	0.24	0.63
N	509	509	509	509	509

Dependent variable: risk assessment index.
 Entries are standardized regression coefficients.
 * Significant at 0.05.
 ** Significant at 0.01.
 *** Significant at 0.001.

Table 3
Evangelical policy support multiple regression.

Independent variables	Model 1 Affect	Model 2 Images	Model 3 Worldviews	Model 4 Sociodems	Model 5 Full
Holistic affect	0.19 ^{***}				0.13 ^{**}
Image affect	−0.05				−0.02
Global warming concern	0.50 ^{***}				0.33 ^{***}
Icemelt		0.04			−0.04
Nature		0.07			0.04
Alarmed		0.13 ^{**}			0.00
Naysayer		−0.43 ^{***}			−0.12 ^{**}
Weather		0.06			0.03
Egalitarianism			0.32 ^{**}		0.07
Individualism			−0.31 ^{***}		−0.19 ^{***}
Gender				0.06	−0.03
Race/ethnicity				−0.10 [*]	0.00
Political ideology				0.20 ^{***}	0.00
Party ID				0.15 ^{**}	0.02
Religiosity				−0.05	−0.02
Household income				−0.09	−0.01
Education (4 Cat)				−0.12 ^{**}	−0.08 [*]
F	107.14 ^{***}	33.45 ^{***}	116.33 ^{***}	17.28 ^{***}	24.91 ^{***}
Adjusted R ²	0.39	0.25	0.32	0.19	0.45
N	499	499	499	499	499

Dependent variable: policy support index.

Entries are standardized regression coefficients.

^{*} Significant at 0.05.

^{**} Significant at 0.01.

^{***} Significant at 0.001.

global warming (Fig. 2). The largest differences are for policies requiring electric utilities to produce at least 20% of their electricity from renewable energy sources ($t(986) = -5.60, p < .001$), regulating carbon dioxide as a pollutant ($t(967) = -6.88, p < .001$), and signing an international treaty requiring the United States to cut its emissions of carbon dioxide 90% by the year 2050 ($t(983) = -5.97, p < .001$). The smallest differences with non-evangelicals include support for a policy to fund more research on sources of renewable energy ($t(1831) = -4.77, p < .01$), and an increase in the gasoline tax ($t(1133) = -3.19, p < .05$).

Nonetheless, however, majorities of American evangelicals support most climate and energy policies, including funding renewable energy research (90%), tax rebates for individuals purchasing fuel efficient cars or installing solar panels (80%), requiring automakers to increase the fuel efficiency of cars, trucks and SUVs (72%), and regulating carbon dioxide as a pollutant (71%).

What factors are associated with evangelical risk assessments of global warming and support for or opposition to climate change and energy policies?

Multiple regression analyses were conducted to identify the individual factors that best predict American evangelical risk assessments and policy preferences, and how much of the variance in these dependent variables is explained by global warming imagery, affect, concern, cultural worldviews, and sociodemographic variables (see Tables 2 and 3). Individual variables were initially entered into separate linear regressions to determine significance. All significant variables were then entered into the multiple regression models.

The sample size of each regression analysis was kept constant to enable comparison between models: $n = 509$ for risk assessment and $n = 499$ for policy support. These sample sizes reflect the total number of participants for which there were no missing values in the full models of each regression analysis.

3.4. Evangelical risk assessment

Model 1: Affect found that holistic affect associated with the term “global warming” and concern about global warming impacts

on the self, others and non-human nature are significant predictors of evangelical risk assessment and explain 59% of the variance ($F(3, 507) = 240.59, p < .001, \text{Adj. } R^2 = .59$). As holistic affect becomes more negative, risk assessment increases and as concern about impacts increases, risk assessment also increases.

Model 2: Images found that the cognitive image categories alarmed, flood/sea level, naysayer, politics and weather significantly predict risk assessment and explain 36% of the variance ($F(7, 503) = 41.97, p < .001, \text{Adj. } R^2 = .36$). More specifically, images associated with alarmism, flooding and rising sea levels, and weather predict higher risk assessments, whereas naysayer and politics-based imagery predict lower risk assessments.

Model 3: Worldviews found that the cultural worldviews of egalitarianism and individualism each predict evangelical risk assessment and explain 26% of the variance ($F(2, 508) = 91.03, p < .001, \text{Adj. } R^2 = .26$). Evangelicals with an egalitarian worldview are more likely to assess global warming as a risk, whereas evangelicals with an individualistic worldview are less likely to assess global warming as a risk.

Model 4: Sociodemographics found that gender, household income, political ideology and political party identification each predict global warming risk assessment and together explain 24% of the variance ($F(7, 503) = 24.44, p < .001, \text{Adj. } R^2 = .24$). More specifically, evangelical women, liberals and individuals with lower incomes are more likely to assess global warming as a risk. Evangelical men, conservatives and individuals with higher incomes are less likely to assess global warming as a risk.

Model 5: Full – all the predictor variables were entered into a final model that explains 63% of the variance in evangelical risk assessments ($F(19, 491) = 46.00, p < .001, \text{Adj. } R^2 = .63$). Holistic affect, naysayer, politics and weather-based imagery, global warming concern, gender, household income, political party identification and ethnicity all predict global warming risk assessment. Global warming concern is the strongest predictor, after controlling for all other variables. Holistic affect and naysayer imagery are also strong predictors indicating that evangelicals who consider global warming to be a bad thing are more likely to see it as a greater risk, whereas evangelicals who provide naysayer

associations to global warming are more likely to see it as a small or non-existent risk. The full model found that global warming concern in particular is a stronger predictor of evangelical risk assessment than affect, imagery, cultural worldviews, or socio-demographic variables.

3.5. Evangelical policy support

Model 1: Affect found that holistic affect and global warming concern significantly predict evangelical support for climate change and energy policies and explain 39% of the variance ($F(3, 497) = 107.14, p < .001, \text{Adj. } R^2 = .39$). More specifically, the more evangelicals consider global warming to be a bad thing and are concerned about its impacts on themselves, others and non-human nature, the more likely they are to support climate change and energy policies.

Model 2: Images found that alarmed and naysayer associations significantly predict policy support ($F(5, 495) = 33.45, p < .001, \text{Adj. } R^2 = .25$). This model explains 25% of the variance and found that evangelicals who associate global warming with alarmed based imagery are the most likely to support policy initiatives whereas evangelicals who hold naysayer associations are less likely to support these policies.

Model 3: Worldviews found that egalitarianism and individualism each predict policy support and explain 32% of the variance ($F(2, 498) = 116.33, p < .001, \text{Adj. } R^2 = .32$). More specifically, evangelicals with an egalitarian worldview are more likely to support global warming policies, while evangelicals with an individualistic worldview are more likely to oppose global warming policies.

Model 4: Sociodemographics found that race/ethnicity, political ideology, party identification and education each predicts policy support, but explains only 19% of the variance ($F(7, 493) = 17.28, p < .001, \text{Adj. } R^2 = .19$). Politically liberal, non-white evangelicals with a lower education level are more likely to support global warming policies. By contrast, politically conservative, white evangelicals with higher education levels are more likely to oppose global warming policies.

Finally, *Model 5:* Full examined the relative contribution of all the variables and found that holistic affect, global warming concern, naysayer associations and individualism are the most significant predictors of policy support and explain 45% of the variance ($F(17, 483) = 24.91, p < .001, \text{Adj. } R^2 = .45$). Overall, evangelicals who are concerned about the impacts of global warming and who consider global warming to be a bad thing are more likely to support climate and energy policies, while evangelicals with an individualistic worldview and those who associate it with naysayer imagery are more likely to oppose these policies. More specifically, concern about global warming is the strongest predictor of policy support; stronger than affect, imagery, cultural worldviews, or sociodemographics.

4. Discussion

The present study was designed to compare evangelical vs. non-evangelical views of climate change and to investigate which of several factors derived from theory and past empirical research best predict evangelical global warming risk assessments and policy preferences. Overall, this study found that American evangelicals are less likely to believe global warming is happening, caused by human activities, and are less worried about it than non-evangelicals. Most evangelicals and non-evangelicals do not believe that global warming will seriously harm them or their family. Evangelicals, however, are less likely to perceive global warming as a threat to their local community, people in the USA, people in other modern industrialized countries, or developing

countries than non-evangelicals. Evangelicals are also less likely to perceive global warming as a threat to future generations or non-human nature. Support for global warming policies, however, reveals a different picture. Although evangelicals are less likely than non-evangelicals to strongly or somewhat support climate change and energy policies, majorities of both groups do support these policies. Despite some stereotypes of evangelical Christians as anti-environmental or dismissive of climate change, it is important to note that majorities of evangelicals *do* believe global warming is happening, human caused, and are at least somewhat worried about it.

Evangelicals, however, are by no means homogenous. As found in the present study, evangelical risk assessments and policy preferences are related to a variety of predictors including affect, worldviews and environmental value orientations. Furthermore, evangelicals are cross-cut by socio-political dimensions leading some, for example, to be more liberal and others to be more conservative in their politics, which in turn is associated with greater or lesser engagement with the issue respectively. To some extent, this diversity of views within the evangelical community about climate change is unique. For many other social issues, including fighting AIDS and reducing poverty, evangelicals exhibit widespread agreement with each other (Nagle, 2008). Climate change, however, has become divisive within this group as it has among the broader American public.

This study found that egoistic, altruistic, and biospheric concern about the impacts of global warming was the single strongest predictor of evangelical risk assessments and policy support. The more evangelicals embraced these three types of environmental concern, the more they perceived climate change as a risk and supported climate and energy policies.

Traditionally, researchers have constructed separate indices to identify different types of environmental concern (egoistic, altruistic, and biospheric) with results supporting one, two, three and even four factor solutions (Stern et al., 1995; Thompson and Barton, 1994; Schultz, 2001, 2000; Snelgar, 2006; Swami et al., 2010). This investigation asked participants how concerned they were about the impacts of global warming on each of these dimensions. A factor analysis found, however, that for the issue of global warming, these measures resulted in only one dimension across the full national sample. The operationalization of concern for the impacts of global warming as a specific environmental issue might have contributed to the uni-dimensional nature of the solution obtained. Compared with other issues, global warming is generally regarded as a distant threat with little personal relevance (Leiserowitz, 2005). Although concern by some evangelicals is driven by a combination of the three value orientations, the distinctions might not be as pronounced as found with other more localized and context-specific environmental issues. As such, it is difficult to identify whether the individual dimensions of biospheric, altruistic, or egoistic concern, or a combination of these dimensions, influences risk assessments and policy support. Given what is known about evangelical values, attitudes and the climate change communication strategies used by some evangelical leaders, however, some interpretations can be made.

The Evangelical Climate Initiative 'Call to Action', for example, argues that global warming is a fundamental moral and ethical issue, as the consequences will be most severe for the world's poor (ECI, 2006). Other evangelical leaders argue that human beings are God's stewards of the natural world and are thus responsible for protecting nature as God's creation. The 'neighbor care' and 'creation care' themes evident in some evangelical communication may thus resonate with the altruistic and biospheric values held by many evangelicals (Wardekker et al., 2009; Wilkinson, 2010, 2012; Prelli and Winters, 2009).

The negative affect associated with the term “global warming” was also found to be a strong predictor of evangelical risk assessments in the present study. This supports prior research that has identified affect as playing an important role in risk perceptions for the American public more broadly (Leiserowitz, 2005, 2006; Smith and Leiserowitz, 2012), and further validates the ‘risk as feelings’ hypothesis (Slovic and Peters, 2006; Finucane et al., 2000).

Cultural worldviews were also found to be strong predictors of evangelical risk perception and policy support in separate models, with individualism having a significant negative effect on policy support when controlling for all other factors in the full model. Evangelicals who hold an individualistic worldview are more likely to oppose policies designed to mitigate global warming. According to cultural theory, those with an individualistic worldview are more skeptical of environmental issues and tend to oppose any policy options, especially those that include government oversight, regulation, or intervention in markets and society (Kahan et al., 2011). More broadly, this finding speaks to the important role values can play underpinning beliefs and attitudes toward risk issues.

More theoretically these results also indicate that, for this group, affect based value orientations, ideologies and worldviews are more important for understanding their divided positions on global warming than theology per se. As Nagle (2008) asserts, evangelicals are similar theologically, almost by definition. Thus if evangelical engagement with global warming were driven by theological beliefs alone, opinion would be less divided. This argument is further reinforced by prominent climate scientist and evangelical Christian Katharine Hayhoe, who argues that evangelicals, unlike members of other organized religions, do not have a figurehead to seek guidance from (Palmer, 2012). Whereas Catholics have the Pope and Anglicans have the Archbishop of Canterbury, evangelicals look to politicians and others in influential positions to inform their beliefs and attitudes. For some this will be prominent Republicans who openly criticize climate change science and for others it will be Democrats who are more favorable.

In sum, this study identifies how American evangelical Christians currently perceive global warming, how they respond to the risks, and what factors influence their views. Complicating Lynn White’s domination argument, American evangelicals’ engagement with global warming appears primarily associated with concern about both the human and non-human impacts of climate change, in line with a stewardship ethic interpretation of Genesis. Further, American evangelicals do not have monolithic views about the issue and appear influenced by a variety of predictors including affect, worldviews and environmental value orientations. This finding has important implications for effective communication. Although strategies calling upon evangelicals to protect God’s creation already exist, tailoring communications to address different groups within the evangelical community might be particularly effective.

Some evangelical leaders have suggested that evangelicals should think about how they will be judged by God on judgment day if they do not act to reduce the threat of climate change to God’s creation and their fellow human beings. For example, evangelical leader Richard Cizik argues that evangelicals need to be reminded that they will be held individually accountable for their action or inaction (New York Times, 2011). Hayhoe and Farley (2009), however, argue that fear and guilt are not the preferred motivations of a loving God. They argue that ‘Love God, love others, and remember the poor’ (p. 127) is a more solid biblical mandate for taking action on climate change and one, they believe, more likely to resonate with people of faith. Past research has also identified political partisanship and ideology as an impediment preventing many conservative evangelicals from accepting climate

change (Hitzhusen, 2011; Wilkinson, 2010). Avoiding the use of partisan language is thus critical, especially for efforts to engage conservative evangelicals in constructive dialog. Given the considerable political and cultural influence that evangelicals exert in the United States, it is especially important to help them understand how and why climate change connects to their own deeply held values.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.gloenvcha.2013.04.001](https://doi.org/10.1016/j.gloenvcha.2013.04.001).

References

- Akerlof, K., DeBono, R., Berry, P., Leiserowitz, A., Roser-Renouf, C., Clarke, K.L., Maibach, E.W., 2010. Public perceptions of climate change as a human health risk: surveys of the United States, Canada and Malta. *International Journal of Environmental Research and Public Health* 7 (6) 2559–2606.
- Boholm, A., 1996. Risk perception and social anthropology: critique of cultural theory. *Ethnos* 61 (1–2) 64–84.
- Bostrom, A., Morgan, M.G., Fischhoff, B., Read, D., 1994. What do people know about global climate-change. 1. Mental models. *Risk Analysis* 14 (6) 959–970.
- Boyd, H.H., 1999. Christianity and the environment in the American public. *Journal for the Scientific Study of Religion* 38, 36–44.
- Dake, K., 1991. Orienting dispositions in the perception of risk: an analysis of contemporary world-views and cultural biases. *Journal of Cross-Cultural Psychology* 22, 61–82.
- Dake, K., 1992. Myths of nature: culture and the social construction of risk. *Journal of Social Issues* 48, 21–27.
- Dake, K., Wildavsky, A., 1990. Theories of risk perception: who fears what and why? *Daedalus* 119, 41–60.
- Dake, K., Wildavsky, A., 1991. Individual differences in risk perception and risk-taking preferences. In: Garrick, B.J., Geckler, W.C. (Eds.), *The Analysis, Communication, and Perception of Risk*. Plenum, New York.
- Damasio, A.R., 1999. *The Feeling of What Happens*. Harcourt Inc., New York.
- Ding, D., Maibach, E.W., Zhao, X.Q., Roser-Renouf, C., Leiserowitz, A., 2011. Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change* 1 (9) 462–466.
- Djupe, P.A., Hunt, P.K., 2009. Beyond the Lynn White thesis: congregational effects on environmental concern. *Journal for the Scientific Study of Religion* 48, 670–686.
- Douglas, M., 1992. *Risk and Blame: Essays in Cultural Theory*. Routledge, London.
- Douglas, M., Wildavsky, A., 1982. *Risk and Culture: an Essay on the Selection of Technical and Environmental Dangers*. University of California Press, Berkeley.
- Dunlap, R.E., McCright, A.M., 2008. A widening gap – Republican and Democratic views on climate change. *Environment* 50, 26–35.
- Eckberg, D.L., Blocker, T.J., 1989. Varieties of religious involvement and environmental concerns: testing the Lynn White thesis. *Journal for the Scientific Study of Religion* 28, 509–517.
- Evangelical Climate Initiative (ECI), 2006. Climate change: an evangelical call to action. Available at: <http://preview.christiansandclimate.org/wp-content/uploads/2008/05/eci-calltoaction-booklet.pdf>.
- Finucane, M.L., 2008. Emotion, affect, and risk communication with older adults: challenges and opportunities. *Journal of Risk Research* 11 (8) 983–997.
- Finucane, M.L., Alhakami, A., Slovic, P., Johnson, S.M., 2000. The affect heuristic in judgments of risks and benefits. *Journal of Behavior and Decision Making* 13, 1–17.
- Finucane, M.L., Peters, E., Slovic, P., 2003. Judgment and decision making: the dance of affect and reason. In: Schneider, S.L., Shanteau, J. (Eds.), *Emerging Perspectives on Judgment and Decision Research*. Cambridge University Press, Cambridge, pp. 327–364.
- Gallup, 2005. Another look at evangelicals in America today. Available at: <http://www.gallup.com/poll/20242/another-look-evangelicals-america-today.aspx>.
- Guth, J.L., Green, J.C., Kellstedt, L.A., Smidt, C.E., 1995. Faith and the environment: religious beliefs and attitudes on environmental policy. *American Journal of Political Science* 39, 364–382.
- Hand, C.M., Van Liere, K.D., 1984. Religion, mastery-over-nature, and environmental concern. *Social Forces* 63, 555–570.
- Hayes, B.C., Marangudakis, M., 2000. Religion and environmental issues within Anglo-American democracies. *Review of Religious Research* 42, 159–174.
- Hayes, B.C., Marangudakis, M., 2001. Religion and attitudes towards nature in Britain. *British Journal of Sociology* 52, 139–155.
- Hayhoe, K., Farley, A., 2009. *A Climate for Change: Global Warming Facts for Faith-based Decisions*. Faith Words, New York.
- Hitzhusen, G.E., 2011. Climate change education for faith based groups. Unpublished Manuscript. Ohio State University.
- Jaeger, C.C., Renn, O., Rosa, E.A., Webler, T., 1998. Decision analysis and rational action. In: Rayner, S., Malone, E.L. (Eds.), *Human Choice and Climate Change*. Battelle Press, Columbus.

- Kahan, D.M., Braman, D., Slovic, P., Gastil, J., Cohen, G., 2009. Cultural cognition of the risks and benefits of nanotechnology. *Nature Nanotechnology* 4 (2) 87–90.
- Kahan, D.M., Jenkins-Smith, H., Braman, D., 2011. Cultural cognition of scientific consensus. *Journal of Risk Research* 14, 1466–1461.
- Kanagy, C.L., Willits, F.K., 1993. A greening of religion? Some evidence from a Pennsylvania sample. *Social Science Quarterly* 74, 674–683.
- Kaplan, M.S., 2010. Will religions guide us on our dangerous journey? In: Moore, K.D., Nelson, M.P. (Eds.), *Moral Ground: Ethical Action for a Planet in Peril*. Trinity University Press, San Antonio.
- Kearns, L., 1996. Saving the creation: Christian environmentalism in the United States. *Sociology of Religion* 57, 55–70.
- Kearns, L., 1997. Noah's ark goes to Washington: a profile of evangelical environmentalism. *Social Compass* 44, 349–366.
- Kempton, W., 1991. Lay perspectives on global climate change. *Global Environmental Change* 1 (3) 183–208.
- Kohut, A., Green, J.C., Keeter, S., Toth, R.C., 2000. *The Diminishing Divide: Religion's Changing Role in American Politics*. Brookings Institution Press, Washington, DC.
- Langford, I.H., Georgiou, S., Bateman, I.J., Day, R.J., Turner, R.K., 2000. Public perceptions of health risks from polluted coastal bathing waters: a mixed methodological analysis using Cultural Theory. *Risk Analysis* 20, 691–704.
- Layman, G.C., Hussey, L.S., 2007. George W. Bush and the evangelicals: religious commitment and partisan change among evangelical protestants, 1960–2004. In: Campbell, D.E. (Ed.), *A Matter of Faith: Religion in the 2004 Presidential Election*. Brookings, Washington, DC.
- Leiserowitz, A., 2005. American risk perceptions: is climate change dangerous? *Risk Analysis* 25, 1433–1442.
- Leiserowitz, A., 2006. Climate change risk perception and policy preferences: the role of affect, imagery, and values. *Climatic Change* 77, 45–72.
- Lupton, D., 1999. *Risk*. Routledge, New York.
- McCammack, B., 2007. Hot damned America: evangelicalism and the climate change policy debate. *American Quarterly* 59, 645–668.
- Moore, K.D., Nelson, M.P., 2010. Toward a global consensus for ethical action. In: Moore, K.D., Nelson, M.P. (Eds.), *Moral Ground: Ethical Action for a Planet in Peril*. Trinity University Press, San Antonio.
- Nagle, J.C., 2008. The evangelical debate over climate change. *University of St. Thomas Law Journal* 5, 53–86.
- New York Times, 2011. Vatican report shines light on climate change divisions within the U.S. faith community. Available at: <http://www.nytimes.com/gwire/2011/05/10/greenwire-vatican-report-shines-light-on-climate-change-98836.html>.
- Nordlund, A.M., Garvill, J., 2003. Effect of values, beliefs and personal norms on willingness to reduce car-use. *Journal of Environmental Psychology* 23, 339–347.
- O'Connor, R.E., Bord, R.J., Fisher, A., 1999. Risk perceptions, general environmental beliefs, and willingness to address climate change. *Risk Analysis* 19 (3) 461–471.
- Palmer, L., 2012. Preachable moments: evangelical Christians and climate change. The Yale Forum on Climate Change and the Media. Available at: <http://www.yaleclimatemediaforum.org/2012/06/preachable-moments-evangelical-christians-and-climate-change/>.
- Peters, E., Slovic, P., 1996. The role of affect and worldviews as orienting dispositions in the perception and acceptance of nuclear power. *Journal of Applied Social Psychology* 26, 1427–1453.
- Pew, 2008. US religious landscape survey. The Pew Forum on Religion and Public Life. Available at: <http://religions.pewforum.org/pdf/report-religious-landscape-study-full.pdf>.
- Pew, 2009. Religious groups' views on global warming. The Pew Forum on Religion & Public Life. Available at: <http://pewforum.org/Science-and-Bioethics/Religious-Groups-Views-on-Global-Warming.aspx>.
- Prelli, L.J., Winters, T.S., 2009. Rhetorical features of green evangelicalism. *Environmental Communication* 3, 224–243.
- Public Religion Research Institute, 2009. Poll – Climate Change and Global Poverty. Available at: <http://www.publicreligion.org/research/published/?id=198>.
- Rippl, S., 2002. Cultural theory and risk perception: a proposal for a better measurement. *Journal of Risk Research* 5, 147–165.
- Robinson, T., 2010. The biblical mandate for creation care. In: Moore, K.D., Nelson, M.P. (Eds.), *Moral Ground: Ethical Action for a Planet in Peril*. Trinity University Press, San Antonio.
- Schultz, P.W., 2000. Empathizing with nature: toward a social-cognitive theory of environmental concern. *Journal of Social Issues* 56, 391–406.
- Schultz, P.W., Zelenzny, L., Dalrymple, N.J., 2000. A multinational perspective on the relation between Judeo-Christian religious beliefs and attitudes of environmental concern. *Environment and Behavior* 32, 576–591.
- Schultz, P.W., 2001. The structure of environmental concern: concern for self, other people and the biosphere. *Journal of Environmental Psychology* 21, 327–339.
- Schwartz, S.H., 1973. Normative explanations of helping behavior: a critique, proposal, and empirical test. *Journal of Experimental Social Psychology* 9, 349–364.
- Schwartz, S.H., Howard, J.A., 1981. A normative decision-making model of altruism. In: Rushton, J.P., Sorrentino, R.M. (Eds.), *Altruism and Helping Behavior*. Erlbaum, Hillsdale, NJ, pp. 89–211.
- Shibley, M., Wiggins, J., 1997. The greening of mainline American religion: a sociological analysis of the environmental ethics of the national religious partnership for the environment. *Social Compass* 44, 333–348.
- Slovic, P., Finucane, M.L., Peters, E., MacGregor, D.G., 2002. The affect heuristic. In: Gilovich, T., Griffin, D., Kahneman, D. (Eds.), *Heuristics and Biases: the Psychology of Intuitive Judgment*. Cambridge University Press, New York, pp. 397–420.
- Slovic, P., MacGregor, D.G., Peters, E., 1998. Imagery, Affect, and Decision-making. *Decision Research*, Eugene, OR.
- Slovic, P., Peters, E., 1998. The importance of worldviews in risk perception. *Risk, Decision and Policy* 3, 165–170.
- Slovic, P., Peters, E., 2006. Risk perception and affect. *Current Directions in Psychological Science* 15, 322–325.
- Smith, N., Leiserowitz, A., 2012. The rise of global warming scepticism: exploring affective image associations in the United States over time. *Risk Analysis* 32, 1021–1032.
- Snelgar, R.S., 2006. Egoistic, altruistic, and biospheric environmental concerns: measurement and structure. *Journal of Environmental Psychology* 26, 87–99.
- Steg, L., Dreijerink, L., Abrahamse, W., 2005. Factors influencing the acceptability of energy policies: a test of VBN theory. *Journal of Environmental Psychology* 25 (4) 415–425.
- Stern, P.C., 2000. Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues* 56 (3) 407–424.
- Stern, P.C., Dietz, T., Kalof, L., 1993. Value orientations, gender, and environmental concern. *Environment and Behavior* 25 (3) 322–348.
- Stern, P.C., Dietz, T., 1994. The value basis of environmental concern. *Journal of Social Issues* 50 (3) 65–84.
- Stern, P.C., Dietz, T., Kalof, L., Guagnano, G.A., 1995. Values, beliefs, and pro-environmental action: attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology* 25, 1611–1636.
- Swami, V., Chamorro-Premuzic, T., Snelgar, R., Furnham, A., 2010. Egoistic, altruistic, and biospheric environmental concerns: a path analytic investigation of their determinants. *Scandinavian Journal of Psychology* 51, 139–145.
- Szalay, L.B., Deese, J., 1978. *Subjective Meaning and Culture: an Assessment Through Word Associations*. Lawrence Erlbaum Associates, Hillsdale, NJ.
- Thompson, S.C.G., Barton, M.A., 1994. Ecocentric and anthropocentric attitudes towards the environment. *Journal of Environmental Psychology* 14, 149–157.
- Tucker, M.E., 2003. *World Wonder: Religions Enter their Ecological Phase*. Open Court, Chicago.
- Wardekker, J.A., Petersen, A.C., van der Sluijs, J.P., 2009. Ethics and public perception of climate change: exploring the Christian voices in the US public debate. *Global Environmental Change* 19, 512–521.
- White, L., 1967. The historic roots of our ecologic crisis. *Science* 155, 1203–1207.
- Wilcox, C., 2000. *Onward Christian Soldiers: the Religious Right in American Politics*, 2nd ed. Boulder, CO, Westview.
- Wilkinson, K.K., 2010. Climate's salvation? Why and how American evangelicals are engaging with climate change. *Environment* 52, 47–57.
- Wilkinson, K.K., 2012. *Between God & Green: How Evangelicals are Cultivating a Middle Ground on Climate Change*. Oxford University Press, Oxford.
- Wills, G., 1991. *Under God: Religion and American Politics*. Touchstone, New York.
- Woodrum, E., Wolkomir, M.J., 1997. Religious effects on environmentalism. *Sociological Spectrum* 17, 223–233.