



# **Psychological barriers and climate change action**

The role of ideologies and worldviews as barriers to  
behavioural intentions

Nína M. Saviolidis

**Lokaverkefni til M.S.-gráðu í umhverfis- og auðlindafræði  
Sálfræðideild  
Heilbrigðisvísindasvið**



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## **Abstract**

This thesis is in two parts: the first part is a literature review and the second part is a research report. In the literature review climate change is presented as an issue of top priority that (to date) has not been effectively addressed despite the potentially dire consequences to all life on the planet. In spite of the increased public awareness, knowledge, and concern we still have not seen widespread action on behalf of individuals either in their role as consumers or in their role as citizens. The discussion addresses possible reasons for this inaction on behalf of the public tracing the role of increased politicization of climate science to the role of ideologies and worldviews in shaping views about climate change. Finally, pro-environmental behaviour is discussed: how to define it, its subcategories and the tension between individual sphere actions and political participation as a way to address climate change.

The research report is based on a cross-sectional, questionnaire study of University of Iceland students ( $N=365$ ) and examines the effect of several ideologies on individuals' intentions to act in a pro-environmental manner and in their acceptance of costly policies to address climate change. The data for the research report was collected for a large cross-cultural research project, with a different research aim, called "Society and Climate Change" by Paul Bain and colleagues. Through a series of multiple regression analyses we find support for the significance and relative strength of the associations between the ideologies and the behavioural categories. Simultaneous testing in two structural models finds mixed support for our hypotheses of the specific contributions of each ideology to each behavioural category. The study indicates that ideologies and worldviews will have to be considered in the design of public persuasion campaigns in the future.

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## **Preface**

This master's thesis is collaboration between the psychology department and the environment and natural resources graduate programme at the University of Iceland. The thesis is comprised of two main parts: a literature review and a research report. In the literature review climate change is presented as an issue of top priority that (to date) has not been effectively addressed despite the potentially dire consequences to all life on the planet. In spite of the increased public awareness, knowledge, and concern we still have not seen widespread action on behalf of individuals either in their role as consumers or in the role as citizens. The discussion addresses possible reasons for this inaction on behalf of the public tracing the role of increased politicization of climate science to the role of ideologies and worldviews in shaping views about climate change. Finally, pro-environmental behaviour is discussed: how to define it, its subcategories and the tension between individual sphere actions and political participation as a way to address climate change.

The research report examines the effect of several ideologies on university students' intentions to act in a pro-environmental manner and in their acceptance of costly policies to address climate change. The data for the research reported here was initially collected for a cross-cultural research project with over 37 participating countries in all continents by Paul Bain and colleagues termed "Society and Climate Change". The aim of that project was to gauge people's views on the social and societal consequences of taking action on climate change regardless of their beliefs about the reality or causes of climate change. The project was based on the collective futures framework by Bain and his colleagues (see for example Bain, Matthe, Bongiorno, Kashima & Crimston, 2013) which relates individuals' beliefs about the future to present-day attitudes and actions. The cross-cultural project intended to find out if people's projections about the future as regards climate change could motivate behaviour in the present across different cultures. Our contribution to this project was to translate the questionnaire into Icelandic, offer some feedback on the cultural relevance of the questions themselves and collect the data for both a student and a community sample.

As already noted, however, in the present study we examined a different question i.e. how ideologies and worldviews might act as barriers to a broad range of pro-environmental action intentions in connection to climate change. We were somewhat limited in our choice of variables due to the length of the original questionnaire which unfortunately did not afford us

much space for additional measurement scales. Such a study has never been done in Iceland before (to my knowledge at least) and offers some interesting insights into the contribution of ideologies to pro-environmental action intentions in the private and political sphere of individual action among Icelandic students.

## **PART A. Literature Review:**

### **Climate change, barriers to action and pro-environmental behaviour**

*“The real story of climate change is the unfolding story of an idea and how this idea is changing the way we think, feel and act.”*

(Hulme, 2009, p. xxviii)

Anthropogenic climate change has been described as one of the most important issues facing our planet and everybody inhabiting it today (Hansen, 2008; Stern, 2006, Ki-Moon, 2014, Watkins, 2007). Many have gone so far as to claim that climate change ‘changes everything’ by which they mean not only the physical environment but our socio-economic systems (Klein, 2014) and the way we practice social science (Moser, Hackmann & Caillods, 2013). The newest Intergovernmental Panel of Climate Change (henceforth, IPCC) report reiterated (but with increased confidence) the already known fact that the “human influence on the system is clear“ and is primarily because of the increased emissions of greenhouse gasses into the atmosphere from various human activities - primarily fossil fuel emissions and land-use changes. We are already seeing the consequences of a warming planet in the form of ocean acidification, the loss of mass of the Greenland and Antarctic ice sheets, the increased rate of the rise in sea level among other events (IPCC, 2013, p.15).

Numerous reports (e.g. National Research Council, 2012; World Meteorological Organization, 2013; World Bank, 2013; SDSN & IDDRI, 2014; Blunden & Arndt, 2014) have been written about the causes and impacts of climate change and possible responses to it (IPCC reports are the most authoritative ones), many conferences have been held to deal with the issue (UNFCCC, 2013); yet the international response has been lacking in both scope and force (Tollefson & Gilbert, 2012) while greenhouse gas emissions continue to grow (GCP, 2013, Peters et al., 2013; Blunden and Arndt, 2014; SDSN & IDDRI, 2014). Indeed, a new milestone was reached in 2012 when we surpassed the 400 parts per million of global carbon dioxide concentration in the atmosphere for the first time in recorded history (NASA, 2013).

The growing alarm and increased confidence expressed by the majority of climate scientists (Cook et al., 2013) that the issue is real, principally man-made and could have catastrophic consequences for the planet (Barnosky, et al., 2012) has not been translated into widespread public action in either the private or the public sphere. This is despite the

enormous concentrated effort to convince the public that anthropogenic climate change is a real phenomenon that needs urgent action. To date, this effort has taken a predominantly informational approach based on the assumption that scientific illiteracy and lack of information lie at the bottom of the apparent public confusion (Zia & Todd, 2010). In addition, informational campaigns have tended to focus on relatively insignificant private sphere actions (such as, changing light bulbs) to address a largely systemic problem (Shove, 2009).

Social scientists and others have been lamenting the public's inaction (both personal and political) towards the issue and have been looking for ways to understand it and ultimately to counter it (f.e. APA, 2009, Grundmann & Stehr, 2010). In fact, and to make matters worse, public opinion in some countries (especially in countries high in carbon dioxide emissions like the US and Australia) has been shifting towards "skepticism" and even so-called "denialism" i.e. people who deny the reality of anthropogenic climate change despite overwhelming evidence of the opposite (Leiserowitz, Maibach, Roser-Renouf & Smith, 2011; Leviston, Leitch, Greenhill, Leonard & Walker, 2011). Outright (or literal) denial has been more prominent in the U.S. where industry-funded think tanks and individuals have been muddying the discourse for quite a while now (Gelspan, 2008; Jacques, Dunlap & Freeman, 2008; Oreskes & Conway, 2010).

Getting the public involved is important when politicians and international negotiations fail time and time again to achieve meaningful agreement. It is also important because dealing with climate change is likely to involve a number of potentially unpopular policies where public support is integral (Dietz, Dan & Shwom, 2007). Social scientists, for example psychologists, sociologists and science communication experts have been hard at work trying to figure out the underlying causes of both disbelief and inaction and the most effective ways to influence behaviour. The research produced by these fields has offered many important insights although, perhaps in part because of the multidisciplinary effort, some conflicting results as well (Roser-Renouf & Nisbet, 2008).

### Barriers to action

One prominent research direction has focused on the so-called barriers to action against climate change. Many different barriers have been identified in the literature with differing levels of importance depending on the context of each study (time and place) although some barriers cut across cultures. Barriers can be psychological, socio-cultural and structural

(political and economic) (Norgaard, 2009; APA, 2009; Gifford, 2011). These categories are not very clear cut as often different categories can become intermixed in ways that makes it is hard to disentangle them. For example, psychological (e.g. political ideology) and structural (e.g. media coverage) barriers often interact with each other in ways that makes it hard to determine which barriers are the most significant ones. At other times what seems like a structural barrier may actually only be a perceived barrier in reality. This is often the case in transportation studies where there is a tendency for individuals to judge alternative transport as inadequate (i.e. a structural barrier) but whose judgements change with increased use of the particular means of transport (indicating only a perceived structural barrier which might be more appropriately dealt with as a psychological barrier) (Collins & Chambers, 2005; Gardner & Abraham, 2008). With this in mind we will now look at some of the more widely researched barriers.

### *Ignorance as a barrier*

Ignorance was one of the first barriers that many assumed was behind inaction on behalf of the public (see Norgaard, 2009 for a review). Public polls indicated that many people did not know about climate change and several people did not understand the intricacies of climate science. Efforts were doubled to educate the public about climate change in the hopes that more knowledge would produce more action. And, indeed, most studies and polls (Lorenzoni & Pidgeon, 2006) have found widespread misunderstanding of climate science including confusing climate change with the ozone hole and climate with weather, as well as, confusion over the primary causes of climate change even as recently as in 2007 (Bord, Fischer & O'Connor, 1998; Dunlap, 1998; Brechin, 2003; Nisbet & Myers, 2007). Some researchers, however, have argued that one does not need to know all the intricacies of the science involved (and a very complicated science at that) to understand the implications of the problem (Read, Bostrom, Morgan, Fischhoff & Smuts, 1994). According to Read et al. (1994) people only need to know two simple facts about climate science to realize the seriousness of the issue: 1) the climate is changing because of increased concentrations of carbon dioxide in the atmosphere and 2) carbon dioxide is increasing due to the burning of fossil fuels by humans.

This view is also reflected in a more recent and widely read opinion article by journalist-turned climate activist- Bill Mc Kibben where he wrote: “When we think about global warming at all, the arguments tend to be ideological, theological and economic. But to

grasp the seriousness of our predicament, you just need to do a little math”. He goes on to argue that understanding the implications of climate change requires only the knowledge of how much warming has been deemed safe (i.e. 2 degrees Celcius), how much we are still able to emit to not cross this limit (565 gigatons) and how much rests in oil reserves that we cannot burn if we intend to stay within this limit (2,795 gigatons) (McKibben,2012).

On the other hand, there might also be an effect of too much information and conflicting messages in the media (Gifford, 2011). As Moezzi and Lutzenhiser (2010) put it "the cacophony of voices and messages and attempts to cajole, convince, advertise, etc. can produce misleading information, confused people and (quite reasonably) reduced trust and a dulled attention."(p.215). This “cacophony“ may be the result of real or perceived uncertainties of climate science and mitigation or adaptation solutions to it. But it is also in part related to conflicting goals such as the constant encouragement of conspicuous consumption alongside appeals to solve environmental issues by changing our harmful lifestyle (Oskamp, 2000). This is then the paradox: on the one hand, consumers are expected to maintain economic growth through shopping and on the other hand they are reprimanded on every turn for not bringing about sustainability in the system – a “strategy” which has been, quite convincingly, termed consumer scapegoatism (Akenji, 2014).

Of course, some level of knowledge is bound to be necessary, but how much is an issue of ongoing debate (Jacques, Dunlap & Freeman, 2008). At any rate, we can certainly not brush off the difficulties and complications raised by different worldviews that people hold and how those interact with their acceptance of scientific information. As such, improving scientific literacy may not be as straightforward a solution as some have suggested (Bord et al., 2000; Stern, 2008). Nor may it be enough to state “simple facts” (as McKibben argues) as if their simplicity alone will make them immune to being contested. This was recognized by Hulme (2014) who has argued that if anything, climate change discourse needs to become less focused on facts and figures and more focused on politics and ethics. This is in part because separating the physical and cultural realities of climate is an impossible task a priori (Hulme, 2009) and in part because “the questions about climate change that really matter will not be settled by scientific facts. They entail debates about values and about the forms of political organisation and representation that people believe are desirable” (Hulme, 2014, para. 14). In other words climate change is different from other environmental issues because it poses “an existential challenge to our contemporary worldviews” (Hoffman, 2008, para. 10); it is this apparent challenge that explains (at least in part) the sheer intensity of the public conflict surrounding the issue which has so shocked scientists and policy analysts (Kahan, 2013).

As studies with focus groups have shown, many people are not interested in hearing “reasons” when those challenge their fundamental beliefs and worldviews. They also do not think that they need to justify their own preferences with reasoning, in part because they believe that preferences do not need to be justified (Conover and Searing, 2005). Indeed, many studies in psychology and science communication have been focusing on how to frame climate change in ways that do not create a controversy and move across socio-political divides (for an overview of research on frames see Chong & Druckman, 2007). Illiteracy is not necessarily the main barrier and facts, however simple, can and will be vigorously contested when the motivation to do so is strong enough. In other words, “the facts of climate science are not self-evident – they are filtered through people’s political ideologies and belief systems” (Corner, 2013, p.9).

In fact, social psychology has long moved away from the “enlightenment” or “naive scientist” model of human cognition which assumes that people are basically rational and any departure from those otherwise rational cognitions can be blamed on limited or inaccurate information (Hogg & Vaughan, 2011). In the vast research literature on human cognition this model holds no real ground anymore. Cognitive biases are the rule, not the exception; we are limited by the brain’s capacity to process information and rely on several cognitive shortcuts (aka heuristics) in our judgement and decision-making to compensate for the shortcomings (Kahnemann, 2003). Not only that, but we are also highly motivated to think in a self-serving manner, guided by a mix of social, personal, emotional (i.e. affective) and often unconscious judgements (Schwartz, 2000; Jost, Glaser, Kruglanski & Sulloway, 2003).

In other words, we are motivated to maintain a positive personal and social identity (e.g. Burke & Stets, 2009). Social psychology has a vast literature and long standing debates focused on identity – personal and social. Personal identity is a self-image or a mental model one has of oneself as defined by idiosyncratic traits and close personal relationships. Social identity refers to an identity that is shared by others e.g. membership in an ethnic group. In other words, it is the self in terms of group memberships (Tajfel, 1982). Positive identity maintenance has been recognized as a strong motivator of behaviour, people generally expend much energy in both maintaining a continuity/coherence of identity and a positive self-image (Vignoles, Chrysochoou & Breakwell, 2002) This motivation is not limited to one’s personal identity but extends to groups one identifies with. It is thought to be the underlying cause of various self-serving biases in thought and cognition (Vignoles & Moncaster, 2007).

Social identity and group categorization is highly implicated in the way people perceive facts and in what they chose to believe and which experts they trust. “People are not

*uninformed* about facts but *misinformed*” and as studies looking into scientific literacy, ideology and reported knowledge in a wide array of issues show, in many cases ideological leanings (e.g. political orientation and party affiliation) can lead to a misperception of reality (Kuklinski, Quirk, Jerit, Schwieder & Rich, 2000, p. 792). As such it is not that people do not have enough information or do not know what the scientific consensus is on certain policy-relevant issues, including climate change but rather that people simply disagree with the scientific facts (Kahan, Jenkins-Smith & Braman. 2010). One recent study, measured scientific literacy and numeracy by asking people to report what they think scientists *know* rather than what they themselves *believe* to be true. Strikingly, the findings showed that people know a lot more about the science than the polls seem to suggest, they are just not willing to say they believe in it (Kahan, 2013).

Despite all the social scientific research, the “naive scientist” model has often guided public campaigns to persuade the public of impending catastrophe and most “proposed solutions [to climate change] are largely dominated by technology, the physical sciences, and economics“ effectively ignoring human motivations to resist or otherwise sabotage these solutions (Spence & Pidgeon, 2010, p. 2).

#### *The politicization of climate science*

The tendency to be wilfully misinformed about climate change may also be related to the way the facts are manipulated for political gain. Conservative think tanks in the U.S. have been implicated as one of the main reasons for the U.S.’s failure to ratify the Kyoto Protocol (McCright & Dunlap, 2003) and in subverting the discussions with the manufactured “Climategate” scandal before the Copenhagen Accord in 2009 (Leiserowitz, Maibach, Roser-Renouf, Smith, & Dawson, 2013). Industry of course has a clear stake in the debate and a need to protect itself from threats to its profits and even, in some cases, continued existence. The majority of these think tanks were funded by the fossil fuel industry (Exxon Mobil and the Koch industries by and large) between 2003-2007 although nowadays it has become more difficult to trace the donations because they go through trust funds which protect the identity of their donors (Brulle, 2014). One thing is clear though, climate change has become a highly partisan issue in the U.S. with mostly Republicans and conservatives expressing disbelief in the science and reluctance to accept relevant policies (Dunlap & McCright, 2008, Kahan, et al., 2012). How much of this political polarization can be blamed on external factors such as conservative think tanks is not clear since several psychological and social factors such as psychological motivations and ideologies may be at play as well.



### *Uncertainty as a barrier*

A related issue is uncertainty and how it is being misused (sometimes deliberately) to undermine climate science. It is easy to manipulate the public perception of scientific uncertainty as the way that scientists speak of uncertainty is different from the ways in which laymen tend to interpret it (Oreskes & Conway, 2010). The IPCC uses probabilities to express risk estimated on the likelihood of various events happening. This common scientific practice of emphasizing uncertainties tends to be misunderstood by many as a lower level of risk than is really warranted by the confidence levels (Budescu, Broomell & Por, 2009). This gives a further opportunity for interested parties to muddle the discourse and misrepresent the true level of uncertainty expressed by the scientific community. Indeed, research on resource dilemmas under experimental conditions has shown that uncertainty (whether perceived or real) tends to make pro-environmental behaviour more unlikely (de Kwaadsteniet, van Dijk, Wit, De Cremer & de Rooij, 2007).

A lot of research in the US has focused on the discourse and framing of climate change in the media (e.g. Anderson, 2009; Boykoff, 2013; Olausson, 2009). Media balance in particular has received a lot of attention as prominent bias in media coverage where people with dubious qualifications have been getting the same or in some cases more attention (air time) than climate experts (Antilla, 2005; Boykoff & Boykoff, 2004). Media discourse could be partly the reason for the results of a recent survey by ipsos MORI (2014) conducted in 20 different countries which asked to what extent people agreed that current climate change was due to human influences. The survey found that climate scepticism is predominantly an Anglo-Saxon trend with the U.S. scoring highest, the UK and Australia following close suit and Canada ranking 7<sup>th</sup>. It is hardly surprising then that in the U.S. so much research focus has been placed on uncovering links behind sceptic/denial campaigns to industry-funded think tanks designed to sow doubt as a means of stifling discourse in the media and ultimately broad political action (e.g. Oreskes & Conway, 2010).

Media discourse and public understanding does not however, work in a one-way direction with the public acting only as passive receptors of messages. In fact, uncertainties and risk factors tend to be interpreted differently by different people based on their membership in certain social groups (Hardisty, Johnson & Weber, 2010). This is well-documented in studies involving risk perception where higher degrees of scientific literacy and numeracy did not lead to heightened perception of climate change risk and concern has been found to be

affected by political ideology more than just knowledge (Hamilton, Culter & Schaefer 2012; Kahan, 2013). The reason here could be the effects of “cultural cognition” or the tendency for people to align their risk perceptions with those of the group they identify with and are more socially invested in (Kahan, 2012; Whitfield, Rosa, Dan & Dietz, 2009).

Media discourse, however, has not been as polarized in the European Union where it has focused more on the certainty of scientific results and the consequences of inaction (Boykoff and Rajan, 2007; Dirikx & Gelders, 2010). This is not to say that business interests have not been influential in Europe but the media discourse on climate change has not been as polarized. For example, the conflict that is often expressed in the U.S. media between scientists and politicians regarding climate change seems to have been more influential on public scepticism there than in other countries in Europe (with the possible exception of France) (Grundmann & Scott, 2012). One study found, for example that in Germany the media discourse on climate change closely followed the position of the IPCC and turned, in addition, “climate policy into a legitimate field for political action” (Peters & Heinrichs, 2005, p.25). In addition, a comparison between media discourse between the US and Germany found that there was far more reference to the IPCC in Germany than in the US and climate sceptics got minimal coverage (Grundmann, 2007). Moreover, it is worth remarking that in France and Germany there are no high profile politicians who are openly skeptical of climate change contrary to the US (Grundmann & Scott, 2012). In fact, “the US press gives nine times more attention to sceptical voices compared to Germany, and four times more than the UK” based on cluster and key words analysis (Grundmann & Scott, 2012, p. 7).

Nonetheless, there is likely some polarization regarding specific policy solutions in Europe as might be expected. For example, there is some polarization within the wind sector in three European countries (Szarka, 2004) and in relation to forest conservation and management in Europe (deKoning, et al., 2014).

### *Concern as a barrier*

Another barrier that has been suggested is that of adequate public concern regarding climate change. Polling surveys show that although knowledge and understanding of the issue is limited, concern is rather high and has been rising with the years. Nonetheless, when people in the U.S. were asked to rank climate change among other problems it did not rank very high on the list of priorities (Carroll, 2007). This has led some psychologists to argue that people are engaging in discounting, i.e. people assume that the issue is not as urgent as others

because they perceive the impacts to be too far off into the future (Uzzell, 2000). However, studies looking at environmental risk evaluations have found little evidence of temporal discounting (Böhm & Pfister, 2005; Böhm & Tanner, 2012) which the researchers attributed to the atemporal aspect of ethical and moral values associated with environmental risks. For example, an oil spill is perceived as equally risky whether it may happen in a month, a year or 10 years (Böhm & Pfister, 2005).

In the EU, citizens ranked climate change third in a list of serious problems facing the world today with the economy taking second place and the category “poverty, hunger and lack of drinking water” taking first place. Almost 70% of the EU-28 citizens consider climate change to be a very serious problem which has remained fairly unchanged since 2011 although the economic situation is now perceived as more serious than climate change. Scruggs and Benegal (2012) reviewed public opinion polls in the US and the EU and found that the economic recession was the main reason behind the declining concern for climate change among the public. Despite the fluctuations though, the level of concern is still quite high which begs the question why we are not seeing more public response in line with the reported levels of concern across the developed world (Norgaard, 2009).

Closer to home, very few opinion polls have been conducted in Iceland concerning climate change (at least to the author’s knowledge). A Gallup poll which was conducted in 127 countries before the Copenhagen Accord (Pelham, 2009) included Iceland. The results for Iceland are rather striking. Although 95% of Icelanders reported that they were aware of the issue (note that awareness does not necessarily equate with knowledge), only 38% in the sample attributed the warming trend to human activities and only 33% perceived it as a personal threat. In a Gallup survey from 2010 around 40% of the Icelandic respondents reported being worried about climate change and 36% reported that climate change was already seriously affecting their own region. Interestingly enough, concern varied with party affiliation as the majority of those voting for the left green and social democrat party (61% and 51% respectively) report being very worried about climate change as opposed to those who vote for more right wing and conservative parties (between 27% and 33%) (Capacent, 2010).

However, in an earlier national survey commissioned by a local environmental NGO 76% of Icelanders had reported being concerned about climate change (Iceland Nature Conservation Association, 2005). A new (yet to be published) survey with a representative and stratified sample of Icelanders offers some preliminary results. The survey found that

approximately 80% of Icelanders report being worried about climate change as a global threat and 60% are worried about climate change's impacts on Iceland in particular. However, only 48% of Icelanders believed that climate change is for the most part due to human influences. (E. Halapi, personal communication, September 3, 2014).

Because of the differences in those polls, any conclusions drawn from them will have to be tentative. If the different reported amounts of concern cannot be traced to methodological difficulties (e.g. the wording of questions or their placing within the survey) then perhaps the "Climategate" scandal of 2009 may have temporarily eroded trust in climate science. Nonetheless, a certain amount of scepticism is also discernible in that merely half of Icelanders believe climate change to be for the most part anthropogenic (although the number has increased since 2009). Finally, a comparison of these Icelandic polls with the European ones is also difficult because Icelanders were not asked to rank issues according to perceived importance.

Besides providing us with a glimpse into public attitudes, polls also point to a different and more philosophical issue, that of looking at problems as separate and discrete. The Eurobarometer for example places water shortages in a different category to climate change yet it is clear that increased temperatures have exacerbated droughts in many areas in the world leading both to "a lack of drinking water" as well as reduced food production, both of which are related to poverty (IPCC, 2014). Furthermore, it has been argued that poverty in many areas is the result of an economic system that increases inequality through the uneven consumption of resources and emissions of greenhouse gasses between different continents (and within nations) (HDR, 2007/2008). It is therefore an open question whether framing climate change in this way i.e. as disconnected from concerns about poverty, water shortages and the economic system is, first of all, in any way justifiable and secondly, useful in the public and political discourse of global environmental change – including changes in climate.

Related to this issue, some studies have also found that when forcing people to take a stance in the form of trade-offs and financial valuation of things that they consider sacred (such as preservation of natural environments or the sanctity of human life) they often react with anger, moral outrage and cognitive confusion (McGraw & Tetlock, 2005; Tetlock, 2003). Contrary to what environmental economics assumes people are often very reluctant to make these sort of trade-offs or to put a price on things they regard as sacred. And, yet, "what seems impossible from certain psychological points of view looks utterly unproblematic from a micro-economic perspective" (Tetlock, 2000, p.239).

At any rate, the newest IPCC report emphasized that the economic effects of inaction against climate change will be far larger than the economic cost of dealing with climate change now (IPCC, 2014). This a point that was not lost to the European public since an overwhelming majority (80%) agrees that using energy more efficiently can boost both the economy and jobs in the EU and 90% believe that it is important for their government to set targets to increase the amount of renewable energy used by 2030 (Eurobarometer, 2014).

### *Knowing what versus knowing how*

So far the present discussion has been focused on ignorance and uncertainty in the sense of not knowing or not being completely certain about the scientific basis of climate change. Ignorance, however, can also take the form of not knowing which actions to take to solve the problem (Gifford, 2011). To put it differently, it is important to distinguish between declarative knowledge (knowing what climate change is and what the causes are) and procedural knowledge (knowing what to do about it and what is most effective) (Roser-Renouf & Nisbet, 2008). This is an important distinction that is far more consequential than is generally recognized by policy analysts (Weber, 2013). Environmental psychologists have long grappled with the mismatch between pro-environmental behaviour and the actual impact of that behaviour for the environment. In the context of climate change, individual acts such as recycling are unlikely to address emissions as effectively as say, a reduction in car use but even environmentally-conscious individuals do not necessarily know that (Steg, van den Berg & de Groot, 2012).

Furthermore, best practice, that is, environmental behaviour that produces the best results for the environment, is also not a clear cut and easy to decipher field. For one thing, best practice is always relevant to specific regions and situations and malleable to change with advances in technology (Gifford, 2011). In Iceland, for example, reductions of carbon dioxide from the transportation sector are much more important than in home energy savings since most of the energy is not consumed by the public sector and comes from (theoretically) renewable resources (National Energy Authority, 2014). Information campaigns and behavioural interventions will need to focus their efforts on the most significant behaviours rather than expend resources on behaviours that are insignificant for the environment (Steg & Vlek, 2009). We will return to this issue later in the section devoted to pro-environmental behaviour (see below).

At any rate, it is clear that the assumption that more knowledge will lead to more concern and therefore to more action has only limited truth. As such, the effort that is still

being expended in information campaigns might benefit from research in psychology and try to target different routes to persuasion than just basic information dissemination. In fact, informational campaigns that have been informed by research strands in psychology have been more effective in inducing behavioural change. Such campaigns have taken three general forms, i) tailored information, ii) modelling and iii) social norms (Abrahamse & Matthies, 2012). In the first approach information is tailored “based on characteristics that are unique to that person, related to the outcome of interest, and [...] *derived from an individual assessment*” (Kreuter *et al.*, 1999). This method has been successfully used in a number of health interventions (Noar, Benac, Harris, 2007) and in reducing home energy use (Abrahamse, Steg, Vlek & Rothengatter, 2007). Modelling is based on Bandura’s social learning theory (1977) and uses role models to strengthen social norms (Steg & Vlek, 2009). Providing information on social norms i.e. what most people of one’s group do has been found to be an effective way to influence pro-environmental behaviour (Cialdini, 2007). In all the above research strands basic information provision was improved and made more effective by psychological research. There have also been attempts to use the insights of cultural theory to develop a more pluralistic climate change discourse not only at public level but also on the level of policy negotiations such as the Kyoto protocol (Vermeij *et al.*, 2006).

However, any psychological interventions will also need to target meaningful and significant environmental action which matches the scale and urgency of the problem at hand (Stern, 2011). We turn now to behaviour and what research has revealed about its adoption by the public and its effectiveness in dealing with climate change.

#### Pro-environmental behaviour: behaviour versus impact

How we define pro-environmental behaviour has important implications for both academic research and its practical applications. Two broad directions can be discerned in the literature followed often by a lively debate of appropriate research focus for environmental psychology. So far, research has predominantly focused on pro-environmental intentions rather than the impact of the behaviour.

Kollmuss and Agyeman (2002) define pro-environmental behaviour as “behaviour that consciously seeks to minimize the negative impact of one’s actions on the natural and built world” (p. 240). This definition is rather restrictive in two senses: a) it implies that people are only or primarily motivated by environmental concerns when they intentionally engage in pro-environmental behaviour and b) the focus is on pro-environmental intentions to act

regardless of the actual impact of those actions on the environment. Steg and Vlek (2009) offer a different definition of pro-environmental behaviour as “behaviour that harms the environment as little as possible, or even benefits the environment” (p. 309). This definition is clearly more focused on actual impact of the behaviour in question and does not exclude pro-environmental behaviour that is not explicitly intentional such as habits or behaviour motivated by other goals.

There is a lively debate within the literature on which should be the focus for environmental psychologists – the behaviour or its consequences (Gatersleben, 2012). Some argue that the ultimate aim for research in psychology should be the behaviour not its impact because impact can be influenced by so many external (i.e. non-psychological) factors such as technological advancements or cultural aspects (Kaiser & Wilson, 2004). Stern (2000) has argued that we need both. On the one hand, we need impact-focused studies in order to accumulate research that is relevant and useful for policy makers by identifying behaviour that makes a large difference. Usefulness as an aim for social science research figures largely also in the World Social Science report (ISSC & UNESCO, 2013) which called for more integrated knowledge systems with a clear application focus in order to turn academic knowledge into action and meet wider societal needs. On the other hand, we also need to focus research on intentions (and beliefs, motives and values) in order to understand behaviour and ultimately change it. There is, however, the possibility of doing both by combining measures of behaviour with measures of impact (Gatersleben, 2012).

In addition to explicit theoretical focus, there are several other reasons why measures of pro-environmental behaviour may not necessarily reflect the actual environmental impact of the behaviours being measured. First of all, it is almost never clear-cut what constitutes as beneficial behaviour for the environment or even which behaviour carries more impact than others. In most cases, determining what constitutes as a significant behaviour needs to be arrived at through complex life-cycle analysis which is often very specific to the region and materials in question (e.g. Hertwich, 2005). As such it is often difficult (if not impossible) to know a priori which behaviour is most beneficial to the environment and often local concerns may clash with global concerns (Gifford, 2011). For the Icelandic situation for example, it is not clear whether eating locally grown grass-fed meat is a more or less pro-environmental choice than importing vegetables and legumes from abroad. Similarly, it is not clear if consuming imported organic produce is more environmental than consuming local non-organic produce.

Measuring impact may thus be understandably limited by constraints on available research resources as significant funds, time and effort needs to be put into interdisciplinary collaborations with scientists in other fields (energy experts, engineers etc.) to determine the local impact of specific behaviours and into the actual measurements which may require hands-on procedures (such as meter readings or the weighing of waste) (Gatersleben, 2012).

In general though, researchers in psychology rarely even think about the actual impact of behaviour when constructing their scales (Gatersleben, 2012) as indicated by the proliferation of studies focusing on high frequency but low impact behaviours (e.g. recycling or refusing plastic bags in shops) instead of high frequency and high impact behaviours (e.g. travel or food choices) or even low frequency but high impact behaviours (e.g. home insulation) (Weber, 2013; Stern, 2011). A further complication is that environmental behaviour can have both direct and indirect effects. Energy use, for example, can be both direct by, say, use of electronic appliances at home, and indirect i.e. embedded in consumer goods purchased by individuals (Stern, 2011).

Furthermore, when composite measures of pro-environmental behaviour are developed the variables are rarely weighted according to the relevant impact of each behavioural item on the list. As such, an individual who reports taking more actions will be assigned a higher score than a person that takes fewer but considerably more significant steps to pro-environmental behaviour. Finally, the reliance on self-reported measures can posit difficulties as well. In addition to the more common response biases, there is also the added complication that most pro-environmental behaviours and decisions take place on the household level whereas self-report measures tend to focus on the individual (Gatersleben, Steg & Vlek, 2002). More detailed measures however might also suffer from further problems such as too much detail (e.g. various calculations and precise measurements) and associated effort required by the participant. Indeed, as anyone who has tried to calculate their own ecological footprint will know, measuring and calculating behavioural frequency and impact is a time-consuming and daunting process prone to all sorts of error.

Despite the difficulties of determining which behaviours are the most significant we do know certain things which are not utilized enough in psychological research. We know that motorized transport is one area with a significant capacity for emissions reductions and the associated co-benefits of more active transportation and a people-centered urban planning (Frank, Greenwald, Winkelmann, Chapman & Kavage, 2010; Maibach, Steg, Anable, 2009).



We also know that the adoption of energy efficient equipment is by far more important than the use of said equipment when it comes to energy savings (Dietz, Gardner, Gilligan, Stern & Vandenberg, 2009). In addition, there is the vastly underutilized area of indirect savings from the production, distribution and disposal of food and consumer products and services. A reduction in consumption in the developed world has long been the focus of IGOs yet no real progress has been made as consumption levels continue to increase despite the efficiency gains (Mont, Heiskanen, Power & Kuusi, 2013).

Psychology has a vast literature on overconsumption and materialism and its negative effects on physical, psychological (Dittmar, 2008) and financial well-being (Garðarsdóttir & Dittmar, 2012). Some research has focused on the benefits of an ecological way of life (Brown & Kasser, 2005) yet reducing consumption has not been prominent in public campaigns by governments, business, IGOs or even ENGOs. All in all, the last decade has been focused mostly on achieving eco-efficiency as a way of reaching consumption levels that are sustainable. However, various research endeavours have found that improvements in efficiency alone will not bring us to sustainable consumption. This is partly because gains in efficiency are often paired with increased use and consumption (Maxwell, Owen, McAndrew, Muehmel & Neubauer, 2011) and partly because developing nations are catching up. Despite this, even prominent IGOs have dropped (or at least watered down) the notion of changing the levels and patterns of consumption in the developed world and concentrate almost exclusively on increasing efficiency. This shift in focus has been attributed to various reasons but the fierce opposition by both business and consumers and ultimately nations towards reduction in consumption is likely to be a major factor (see Fuchs & Lorek, 2005 for a more detailed discussion). Put differently, “climate change demands that we consume less, but being consumers is all we know” (Klein, 2014). Psychology could utilize its research base better by focusing more on interventions that target consumption and its reduction directly and emphasizing the co-benefits of downscaling.

#### *Private sphere versus political sphere of action*

A further distinction that can be drawn for pro-environmental behaviour is that which is performed in the private sphere and that which is performed in the public sphere. Behaviour in the private sphere usually involves consumption and travel choices as well as energy conservation efforts. However, as discussed above, many studies have focused on behaviours that are rather inconsequential in the big scheme of things and especially as regards climate

change mitigation. The focus has mostly been on consumer behaviours such as green purchasing, composting, recycling, and turning off unneeded lights – all of which are not very significant (Gatersleben, 2012).

The main issue is that the aggregated effect of many individuals acting to reduce their personal emissions through small behavioural changes is not enough to constitute a significant reduction in emissions as a whole (MacKay, 2009). Yet many public campaigns and countless newspaper articles have been promoting small easy steps to behavioural change (including in Iceland; see for example, Icelandic Environment Association, 2008). The implicit assumption behind these campaigns is that small easy actions will “spill-over” to bigger more difficult and more consequential actions. So, for example, if an individual can be persuaded to recycle she will also be more likely to drive less or at least to reduce waste (a more related behaviour to recycling). Yet, this picture is fairly simplistic and seems to regard pro-environmental behaviour as unidimensional i.e. that different pro-environmental actions are correlated and are motivated by the single goal of environmental protection (Gatersleben, 2012). Most research, however, has found that pro-environmental behaviour is multi-dimensional and behaviours tend not to correlate across domains (Thørgersen & Ölander, 2003; but see also Kaiser and Wilson, 2004 for a contrasting perspective). In addition, there are usually many different motivations underlying a single pro-environmental action and different actions may be motivated by different antecedents (Steg & Vlek, 2009).

A further issue yet is that excessive focus on individual responsibility in people’s private lives tends to take the attention away from the responsibility of more powerful actors such as the government and business and may underplay and undermine the importance of promoting a more politically oriented pro-environmental behaviour (Thørgersen & Crompton, 2009). In other words, it is important to address interventions for behaviour change not only to individuals as consumers but also to individuals as citizens.

The common thread behind these issues is whether a “super wicked” problem (Levin, Cashore, Bernstein & Auld, 2010) such as climate change can even be tackled at the individual level since it is rather clear that solutions will need to be large in scale and will need to happen fast in order to keep the warming below a safe limit (Hansen et al., 2013). A similar sentiment expressed also by Thomas Friedman (2007) in his column on the New York Times where he argued that it is more important to “change [our] leaders than to change [our] light bulbs” (para.1). Others have pointed out that personal commitments to reduce emissions

in the private sphere have at least the effect of people becoming more accepting of political action to reduce emissions. However, the research is not unequivocal on this point (Thøgersen & Crompton, 2009). The problem is that positive correlations between private sphere behaviours and political sphere behaviours do not prove that simple behavioural changes have led to political support of or demand for environmental policies. Instead, it may be that those who were concerned about the environment in the first place were engaged in both types of behaviour. One recent study found that simple green behaviours did increase acceptance of wind power after controlling for environmental concern (Thøgersen & Noblet, 2012). Those are promising results but more research will need to be done in this domain to reach any conclusive results.

Ultimately, the question is whether value change will (or, even, can) occur fast enough for climate change to be effectively addressed. As Moser (2013) put it: “society’s progress in reducing [environmental] impact is “glacially” slow – a metaphor the English language must soon let go of“(p. 283).

## **PART B. Research Report:**

### **Barriers to climate change action: the role of worldviews and ideology**

#### **Abstract**

Climate change is undeniably a top priority issue yet the policy response has been ineffective at best and detrimental at worst. When international negotiations fail time and time again to reach any meaningful agreement, getting the public involved will be integral. This cross-sectional, questionnaire study of students at the University of Iceland ( $N = 326$ ) examines the role of ideologies and worldviews as barriers to pro-environmental behavioural intentions in participants' private and political spheres of action. In particular, we examined two of the barriers recommended by Gifford (2011) i.e. system justification, nature-human relationship, in addition to two others i.e. social dominance orientation and left/right political orientation and how they related to two categories of private sphere behavioural intentions i.e. energy and consumption and three categories of political sphere action intentions i.e. passive and active political participation and acceptance of costly policies. Through a series of multiple regression analyses we found support for the significance and relative strength of the associations between the ideologies and the behavioural categories. Simultaneous testing in two structural models found mixed support for our hypotheses of the specific contributions of each ideology to each behavioural category. The study indicates that ideologies and worldviews will have to be considered in the design of public persuasion campaigns in the future.

Anthropogenic climate change has been described as one of the most important issues facing our planet and everybody inhabiting it today (Hansen, 2008; Stern, 2006, Ki-Moon, 2014, Watkins, 2007). However, despite numerous reports (e.g. IPCC, 2014a; National Research Council, 2012; World Meteorological Organization, 2013; World Bank, 2013; Blunden & Arndt, 2014) international conferences (UNFCCC, 2013) and public information campaigns, the international response has been lacking in both scope and force (Tollefson & Gilbert, 2012) while greenhouse gas emissions continue to grow (GCP, 2013, Peters et al., 2013; Blunden and Arndt, 2014; DDPP, 2014). In the meantime, there are still significant numbers of the public around the world who remain unconvinced of the realities of climate change (Leiserowitz, Maibach, Roser-Renouf & Smith, 2011; Leviston, Leitch, Greenhill, Leonard & Walker, 2011). Social scientists and others have been lamenting the public's inaction towards the issue and have been looking for ways to understand it and ultimately to counter it (e.g. APA, 2009, Grundmann & Stehr, 2010).

Getting the public involved is important when politicians and international negotiations fail time and time again to achieve meaningful agreement. It is also important because dealing with climate change is likely to involve a number of potentially unpopular policies where public support is integral (Dietz, Dan & Shwom, 2007; Oskamp, 2000). The call for widespread behavioural changes will only grow in the coming decades as climate change's more severe impacts begin to hit home exacerbating already serious environmental and social problems (IPCC, 2014b). We are already committed to a certain amount of temperature rise but theoretically we can still meet the 2°C target, although "leeway is getting tight, particularly in the face of socioeconomic and technological inertia" (Zickfeld et al., 2013, p.5807). The role for social science is clear: discover the underlying causes of both disbelief and inaction and develop the most effective evidence-based ways to influence behaviour (Oskamp, 2000; ISSC & UNESCO, 2013).

#### Barriers to Ecologically Responsible Behaviour (ERB): the role of worldviews and ideology

One prominent research direction in psychology has focused on the so-called barriers to action against climate change. Many different barriers have been identified in the literature with differing levels of importance depending on the context of each study (time and place) although some barriers cut across cultures. Barriers can be psychological, socio-cultural and structural (political and economic) although the taxonomy is largely theoretical and differs among researchers (APA, 2009; Bazerman, 2008; Gifford, 2011; Norgaard, 2009).

Gifford (2011) offered a comprehensive theoretical overview of possible barriers (or dragons as he calls them) to ERB as it relates to climate change. He proposed that religious and political views broad as they are in their sphere of influence could become "strong barriers to behavioural change" especially under conditions where behaviour is not severely constrained by structural barriers (e.g. infrastructure, financial means, access to political power etc.) (Gifford, 2011, p. 293). There is some evidence that worldviews in the form of values, cultural meanings and political orientation are influencing the perception of climate change and associated risks on the one hand (e.g. Kahan, et al., 2012; Unsworth & Fielding, 2014) and the willingness or motivation to participate in pro-environmental behaviour on the other (e.g. Dietz, Stern & Guagnano, 1998)

Much of the research that has been conducted with relation to political and religious ideology has been concentrated on the top-down processes that may affect ideology, such as, media balance as bias (Antilla, 2005; Boykoff & Boykoff, 2004) and agenda setting (Liu,

Lindquist & Vedlitz, 2009), conservative think tanks and well-funded denial campaigns (Brulle, 2014; Leiserowitz, Maibach, Roser-Renouf, Smith, & Dawson, 2013; McCright & Dunlap, 2003; Oreskes & Conway, 2010), and the role of the sceptical blogosphere (Sharman, 2014) in disputing the scientific consensus on global climate change (Cook et al., 2013) and muddying the discourse.

Notwithstanding the relevance of this research direction, psychological research indicates that ideology is also influenced by bottom-up factors, such as, psychological motivations and needs which correspond to different ideologies and interact in a complex, dynamic fashion with top-down factors (Jost, Kay & Thorisdottir, 2009). As such, no account of ideological barriers will be complete without these psychological factors as well, and their study can inform both policy and interventions. In fact, if psychological factors were not important then we would be seeing a much greater effect of information dissemination on attitudes and/or behaviour, yet, to date, these informational campaigns have been relatively ineffective on their own (Ockwell, Whitmarsh & O'Neill, 2009; Stern, 2011).

It has been argued, quite convincingly, that climate change poses “an existential challenge to our contemporary worldviews” (Hoffman, 2008, p.5) and as such it is imperative to address it as a socio-cultural problem (Hulme, 2009; ISSC & UNESCO, 2013; Palsson et al., 2013). It follows that we need to devise solutions that go beyond the present ones that are “largely dominated by technology, the physical sciences, and economics” (Spence & Pidgeon, 2010, p.2) effectively ignoring human motivations to resist or otherwise sabotage these solutions.

In the present study we investigated some of the ideological and worldview barriers recommended by Gifford (2011) (i.e. system justification, nature-human relationship) in addition to two others which could be of importance as well (i.e. social dominance orientation and left/right political orientation<sup>1</sup>) and how they relate to behavioural intentions in a wide range of individuals' private and political spheres of pro-environmental action and policy acceptance.

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<sup>1</sup> A self-reported liberal/conservative dimension was also tested but was nonsignificant in all categories and was thus dropped early on in the analysis. One reason why there were no significant effects may be that the liberal/conservative dimension may not be as conceptually and practically clear in Iceland as it is in the U.S., for example.

### *Left/Right Political Orientation*

Left/Right political orientation is best conceptualized as a continuum with individuals scoring somewhere along the line and representing two poles that are diametrically opposed to each other. For historical reasons, left and right have been associated with liberalism and conservatism respectively, in the U.S. so most studies on political orientation focus on that dimension but the terms are usually equated (Thorisdottir, 2012). The right has generally been associated with resistance to change and the acceptance of inequality whereas the left has been associated with openness to change and equality and redistribution (Jost, Glasser, Kuglanski & Sulloway, 2003).

A large cross-cultural analysis using data from the World and European Value Surveys found that individuals who identify themselves as left-wing are more likely to be supportive of environmental protection and prioritize it over economic growth, place greater trust on the green movement and are more likely to report engagement in pro-environmental political behaviour. Interestingly, however, they were *not* more likely to report consumer behaviour such as purchasing green products and recycling or reusing products than right-wing individuals (Neumayer, 2004). Several studies have also found that conservatism (especially fiscal) is associated with less concern about environmental problems (Allen & Castano, 2007) and the effect is more pronounced as regards climate change in the U.S. (McRight & Dunlap, 2011; Hamilton, 2011). Pro-environmental behaviour and intentions as well as policy support to improve the environment has also generally been associated more with liberalism than conservatism (Dietz, Dan & Shwom, 2007; Dietz et al., 1998).

### *System Justification Theory (SJT)*

System justification is “the psychological process by which existing social arrangements are legitimized, even at the expense of personal and group interest“ (Jost & Banaji, 1994, p.2). System justification can be a variable that is important above and beyond political ideology because according to SJT when there is an increased motivation to rationalize “the way things are” then people are more likely to defend ideologies that justify the status quo (Jost, et al., 2009). This motivation may partly stem from external or internal threats to the system, in this case, threats posed by environmental problems to both economic and social institutions (Feygina, Jost, Goldsmith, 2010). Climate change is a particularly good candidate as a threat to the system, in part because of the very real physical danger it imposes to humans, but also because of its threat to the current socio-economic system. In fact, the picture is more

complicated because climate change is an endogenous threat to the system i.e. current socio-economic practices arguably need to change in order to deal with it (Feygina, 2012). Facing up to the threat of climate change means accepting both that the status quo is the main culprit and that it needs to be changed to effectively address it (Feygina, 2013). Indeed, Feygina et al (2010) found evidence that the tendency to justify the system was associated with greater denial of environmental problems and less commitment to pro-environmental behaviour.

Studies on system justification have found that despite American people's awareness of the economic disparities present within the U.S., they nonetheless tend to perceive the current economic system to be fair and legitimate suggesting a defensive motivation (Jost, Blount, Pfeffer & Hunyady, 2003). System justification need not be a priori synonymous with political conservatism but this has been the tendency in modern Western democracies (Jost et al., 2009). For example, in one cross-national study the strongest conservative opposition to environmental protection was observed in developed, capitalist societies whereas in developing nations (with worse environmental conditions) conservatism was more linked to environmental concerns than liberalism (Nawrotzki, 2012). In western capitalist societies, the core values of conservatism (i.e. resistance to change and justification of inequality) just so happen to align well with defending the current socioeconomic system and with resisting changes to a more sustainable and equitable status quo (Jost & Hunyady, 2005). As such, system justification and the denial of climate change tends to be more pronounced among conservatives than liberals in the Western world (Feygina et al., 2010).

Related to this, the endorsement of free-market economics has been repeatedly found to be strongly related to the rejection of anthropogenic climate change (Heath & Gifford, 2006; Kahan, 2010; Lewandowsky, Oberauer & Gignac, 2013). McRight and Dunlap (2011) also point out that that the conservative movement in the U.S. is denying the realities of climate change in an effort to defend the "industrial capitalist order from critique" (p. 155).

#### *Social Dominance Orientation (SDO)*

Social Dominance Theory (SDT) takes for granted that "all human societies tend to be structured as systems of *group-based social hierarchies*" (Sidanius & Pratto, 2004, p. 420) where one or more groups tend to enjoy more privilege and power (i.e. positive social value) than the other groups. SDT does not deny that individuals may have individual qualities that might get them ahead in life but emphasizes that personal achievement does not take place in a vacuum but is related to the status and power of the groups one belongs to (Sidanius &



Pratto, 2004). It shares some common features with SJT in the sense that both theories focus on ideologies that depend on “legitimizing myths“ which are endorsed by individuals for their system-justifying qualities. According to SDT, “the extent to which an individual endorses legitimizing myths depends upon whether he or she generally endorses, desires, and supports a system of group-based social hierarchy“(Sidanius & Pratto, 2004, p. 426). Social Dominance Orientation (SDO) is conceived as a generalized individual orientation which reveals the tendency to favour inequality among social groups and the superiority of one’s own group (Kteily, Ho & Sidanius, 2012; Pratto, Sidanius, Stallworth & Malle, 1994). Studies have found that people who score high on SDO are less likely to support policies that reduce inequality and more likely to support capitalism, more likely to hold negative attitudes about the poor and score high on Machiavellianism (Pratto et al., 1994, Pratto et al., 2000; Sibley & Duckitt, 2010).

More recently, SDT has been extended to include not only inter-human group dominance but also the human dominance over nature and animals based on the belief (i.e. “legitimizing myth”) that humans are “separate from nature and more worthy than other organisms“ (Milfont, Richter, Sibley, Wilson & Fischer, 2013, p. 1127). High levels on SDO have been found to predict speciesism (the belief that humans should dominate over and have the right to exploit animals) (Dhont & Hodson, 2014; Dhont, Hodson, Costello & MacInnis, 2014) and lower levels of environmental concern and belief in anthropogenic climate change (Milfont et al., 2013; Milfont and Duckitt, 2010). A simulation study also found that individuals who score high on SDO tend to make more unethical environmental decisions (Altemeyer, 2003).

#### *Nature/Human Relationship*

Presumably the greater the perceived relation between humans and nature the less likely one is to believe in the legitimacy of a human domination over nature (Kashima, Paladino & Margetts, 2014). Gifford (2011) suggests that the belief in suprahuman powers may be an important barrier to climate change action because individuals may believe that God will save them or Nature will take its course. In this consideration Gifford seems to be connecting fatalism to religious and spiritual beliefs. That may well be so, however, there is another way in which the belief in suprahuman powers has been related to religious and cultural beliefs, that is, via the pervasive belief that humans are the most important species on the planet (anthropocentrism) and should, therefore, dominate over nature. For example, in a highly

influential and controversial article, White (1967) implicated Christianity in the shaping of such modern ideas which support the overexploitation of nature.

Dunlap and VanLiere (1984) also argued that environmentalism poses a challenge to societal ideas about nature and our relationship to it. Their scale is designed to measure endorsement of a more ecological worldview or “paradigm” in which, among other ideas, humans do not have the right to rule over nature (i.e. the New Ecological Paradigm- NEP). The NEP has been found to be positively related (albeit weakly) to pro-environmental attitudes and behaviour (Dunlap, VanLiere, Mertig & Jones, 2000). Another research direction has been examining the (mostly indirect) influence of biocentric values on pro-environmental behaviour. Biocentric values are self-transcendent values which are concerned with the quality of nature for its own sake emphasizing in part unity with nature and harmony with other species (De Groot & Steg, 2007).

Although these conceptualizations and measurement instruments differ somewhat they all share the common concept that the closer one feels to nature the more likely one is to hold pro-environmental attitudes and engage in some form of pro-environmental behaviour, as such, it is likely to be an important aspect of how worldviews may influence behaviour. The variable used in this study is more related to this perspective in that it measures the degree of relation an individual believes there is between her and the natural environment. One study which used the same measurement, found that individuals who identified themselves as environmentally friendly tended to see greater overlap between nature and humans (Kashima, Paladino & Margetts, 2014).

#### Pro-environmental behavioural intentions

There is some debate in the literature as to whether research should be focused on the behaviour itself (e.g. intentions) or its consequences (environmental impact) (Gatersleben, 2012). As Stern (2000) points out, research focus largely depends on the ultimate purpose of a study. If the purpose is to understand how behaviour relates to attitudes, values or motives then behavioural intentions should be a good starting point regardless of actual environmental impact. Nonetheless, when intention-studies are done, it is important for researchers to be aware of the relevant environmental significance of people’s self-reported intentions. Behavioural intentions can offer insight into people’s beliefs about the environment and the impact of their actions and how those beliefs might relate to other beliefs and values (Stern, 2000).

Another issue that is important as regards research focus and especially measurement is whether pro-environmental behaviour is uni- or multidimensional (Gatersleben, 2012; Vining & Ebreo, 2002). Most of the research indicates that pro-environmental behaviour is, in fact, multidimensional, that is, most behaviours tend not to correlate with each other across different domains (Thøgersen & Crompton, 2009) and often there are many different antecedents underlying different kinds of behaviour (Steg & Vlek, 2009). However, some behavioural clusters have emerged in research such that, at least, some broad behavioural categories can be drawn i.e. private and political sphere actions and policy acceptance have been differentiated empirically (Stern, Dietz, Aber, Guagnano & Kalof, 1999; 1995; Stern, 2000).

#### *Private sphere behavioural intentions*

Private sphere behaviour has generally been defined as “the purchase, use, and disposal of personal and household products that have environmental impact” (Stern, 2000, p. 409). Private sphere individual actions have a direct effect on the environment but are relatively inconsequential unless adopted by a significant number of people. Some individual sphere behaviours are also not consequential enough even in their aggregate effects (McKay, 2008). Nonetheless, private sphere behaviours (in particular, consumption behaviour) can serve as a form of environmental movement support signalling ethical and environmental concerns and preferences to government and industry (Stern, et al., 1999).

Furthermore, there is the question of whether values and ideologies affect consumer behaviours, at least when severe structural barriers are not present (e.g. financial constraints). As a case in point, one recent experimental study found that when products were labelled as good for the environment, conservative individuals were less likely to purchase them, even though they provided them with financial benefits from energy efficiency. The purchase probability for liberals, on the other hand, did not change with environmental labelling (Gromet, Kunreuther & Larrick, 2013). As Dietz, Leshko and McCright (2013) put it “policy support and consumer decisions depend not only on facts, but also on values“ and call for more extensive research in this area to determine, among other things, which other consumption choices might be affected by ideology as well (p.9191).

Private sphere behaviours may also form different clusters which are likely to have different determinants (Stern, 2000). For example, it is likely that reducing car use is motivated and affected by different reasons than, say, recycling. Research has often been

carried on a single category of pro-environmental behaviour e.g. green consumerism, residential energy conservation, transport behaviour or even a single behaviour such as recycling or water conservation although the distinction is often not firmly based on empirical grounds (Gatersleben, 2002). We found evidence for two distinct factors, consumer behaviour and energy conservation via factor analysis (see Appendix A).

#### *Public sphere behavioural intentions*

Dealing with environmental problems of such scale, severity and urgency as global climate change is going to take widespread social and economic changes (Hansen, et al., 2013). As such, behaviours in this category are related to an individual's public sphere of action as opposed to behaviours performed in her private life (Stern, et al., 1999). Many different pro-environmental behaviour scales have been developed reflecting different operationalizations of pro-environmental behaviour which makes the comparison between studies difficult (Dono, Webb & Richardson, 2010). In addition, the taxonomy of environmental behaviours differs among researchers reflecting different theoretical approaches often guided by different research disciplines (Wakefield, Elliott, Eyles & Cole, 2006).

Following Stern (2000) we differentiate between activism (e.g. active participation in environmental movements, protesting) and non-activist behaviours in the public sphere (e.g. policy acceptance, voting for the environmentally friendly candidate) although in our study activism was found to encompass more varied behaviours (see Appendix B for factor analytic results).

#### The case of Iceland

Iceland has a reputation of being a very environmentally-friendly country, in part, because of its renewable energy resources and, in part, because of the way the country is projected by the tourism industry's advertising campaigns which highlight natural beauty and purity (Karlsdottir, 2013). Yet the picture is more complicated than that; a recent study which investigated the capacity of various indicators in assessing a country's environmental credentials, concluded that Iceland is not the picture of sustainability it promotes abroad (Olafsson, Cook, Davidsdottir, Johannsdottir, 2014). For a country which depends so much on its green profile (for both tourism and energy utilization) this should be a troubling conclusion.

At any rate, public concern about climate change in Iceland is rather high. New preliminary results from a nationally representative and stratified sample of Icelanders found that approximately 80% report being worried about climate change as a global threat and 60% are worried about climate change's impacts on Iceland in particular (E. Halapi, personal communication, September 3, 2014). Yet, a report which looked at the ethical consumption of Icelanders found that "high reported concern for environmental issues is not matched by a corresponding level of awareness of green consumerism" (Pezzini & Gardarsdottir, 2012, p.10). In fact, Icelanders have the highest Ecological Footprint of any nation in the world largely due to massive imports of consumer goods, cars and oil (Jóhannesson, 2010). In addition, only 48% of Icelanders believe that climate change is for the most part due to human influences (E. Halapi, personal communication, September 3, 2014). From these few studies a tentative conclusion can be drawn that there might be a gap between reported concern and action in Iceland.

Finally, no study has investigated political ideology as a barrier to climate action in Iceland before. A national poll found that concern about climate change varied between parties with those voting for more left wing parties reporting higher levels of concern than right wing party voters (Capacent, 2010). The poll, however, could have been affected by prominent media discourse at the time about the manufactured "Climategate" scandal which is likely to have eroded trust in climate science for a while.

Climate change is a global issue with varied regional and local impacts. Although Iceland is small, a lesson learned also from the recent financial recession is that no country is an island of its own. Nowhere is this realization more pertinent than in the fight against global climate change.

### Aims and hypotheses

This study was part of a larger cross-cultural research project by Bain and colleagues termed "Collective Futures: Society and Climate Change" which aims to investigate how individuals' visions about the future of their society might motivate behaviour in the present (e.g. Bain, Matthe, Bongiorno, Kashima & Crimston, 2013; Bain, et al., manuscript in preparation). The study asked participants to imagine a future where climate change has already occurred and to rate among other things their intentions to take pro-environmental action as well as their support for costly policies to bring about their preferred future societal scenario.

In the present study, however, the main aim was to investigate the effects of different kinds of ideologies on pro-environmental behaviour in the private and political sphere and in policy acceptance as relates to climate change. In general, we expect all the ideologies to be predictive of pro-environmental intentions in both spheres but more so for the political sphere (hypothesis 1). More specifically, based on past research discussed in the introduction, we expect that the first three ideologies (i.e. left/right orientation, system justification and social dominance orientation) will all be negatively related to all the different aspects of pro-environmental behaviour such that the more to the right an individual situates herself the less likely she will be to report pro-environmental intentions in both the private (hypothesis 2a) and the political sphere (hypothesis 2b). Based on prior research we also expect left/right political orientation to be a stronger predictor of political sphere behavioural intentions and policy acceptance than private sphere intentions (hypothesis 2c). In Iceland, environmental issues were found to have the strongest relationship to left/right political orientation in a study which looked at six potentially polarizing issues (Thorisdottir, 2012). However, no studies have explored this in relation to climate change so any predictions are difficult to make. The national Gallup poll from 2010 found that more than half of the people who voted for more left-wing parties reported being very worried about climate change as opposed to approximately one third of those voting for more right-wing parties (Capacent, 2010). Prior research results have been mixed as relates to the effect of left/right ideology on private sphere behavioural intentions. On the one hand, we might expect no significant differences on consumption behaviour (e.g. based on Neumayer's results). On the other hand, as was also discussed in the introduction, there has been some evidence that environmental labelling can have an effect on the purchase behaviour of more conservative people (Gromet, Kunreuther & Larrick, 2013).

It is likely, however, that a higher tendency to endorse the current system will be associated with less likelihood in reporting pro-environmental intentions in both the private (hypothesis 3a) and the political sphere (hypothesis 3b). In addition, we expect system justification tendencies to be more pronounced with political sphere behaviours in part because the private sphere behaviours we explore here should not be so consequential as to serve as system threatening changes (hypothesis 3c).

Furthermore, the more an individual endorses inequality among groups the less likely she will be to report pro-environmental behavioural intentions in either the private (hypothesis 4a) or the political sphere (hypothesis 4b). We expect social dominance orientation to be a

stronger predictor of political sphere pro-environmental behavioural intentions since those are more consequential to group hierarchies than are the private sphere behaviours included in this study (hypothesis 4c).

Finally, we expect that the fourth ideology, i.e. human nature overlap, will positively predict pro-environmental intentions in both the private (hypothesis 5a) and political spheres (hypothesis 5b) although it is difficult to predict how strong this effect will be, in part, because this is a relatively new measurement. Nonetheless, we expect to see positive effects but potentially weak in line with prior research on pro-environmental worldviews and values (albeit with different measurements) finding weak and indirect effects on pro-environmental behaviour (see discussion above).

We tested the hypotheses in two ways. Firstly, we assessed the strength of the associations for each of the behavioural factors by running a series of multiple regressions. Then, the same associations were tested by assessing them simultaneously in a structural model via structural equation analysis.

## **Method**

### *Participants and procedure*

This cross-sectional questionnaire study is part of a larger international cross-cultural project with 37 participating countries around the world. The present analyses were performed only on the Icelandic student sample. The original questionnaire was in English. The translation to Icelandic was done according to conventional cross-cultural, parallel- and back-translation techniques (Brislin, 1980; Hambleton, 1994).

Responses were solicited by email targeted to all students at the University of Iceland resulting in 616 responses. Every participant received a message with a short description of the study's aims and a link to the online Qualtrics survey. Participants were told that they could opt out of the study at any point and that their responses were anonymous. They were also offered the chance to participate in a draw in order to win 20,000 ISK (equivalent to 130 EUR approximately at the time of study) in the form of an Amazon gift card.

Out of the original sample of 616 Icelandic students, 328 cases remained in the analysis after missing values analysis with SPSS. At the first stage, 359 cases with responses to less than half of the variables under study were removed leaving 328 cases. A further two cases had to be removed for potentially violating rules for MCAR as revealed by correlations

with dichotomous variables leaving 326 cases. Finally, 76 missing values within these 326 cases were imputed with ML estimation using the statistical programme EQS.

The average age of the respondents used in the analysis was 29 years ( $SD = 10.2$ , range = 19-62). Of those who reported their gender 28,2% were male and 69,9% were female.

### *Measures*

The original questionnaire consisted of three sections measuring key psychological variables followed by a section dealing with background information. Although not all the questions asked explicitly about climate change, participants were, nonetheless, primed to think about it since the first section was entirely focused on climate change and the title of the study itself was “Climate change and Icelandic society”. The following are selected measurement scales and variables included in the present study.

### *Independent variables*

*Left/Right Political Orientation* was measured by one item which asked participants to self-report their political orientation on a scale of 1-10 with 1 being left and 10 being right. In particular, participants were asked “*In political matters, people sometimes talk about "the left" and "the right." How would you place your views on this scale, generally speaking?*” The dimension of left and right within the Icelandic political context has been researched before and shown to be both consistent across issues and meaningful in the minds of Icelandic voters at least in the last two decades (Thorisdottir, 2012). In our study we treated it as an indicator for political orientation and fixed its error variance to 1 in all structural equation analyses.

*System Justification* was measured with a scale comprised of 8 items designed by Kay and Jost (2003) adapted for the purposes of this study (i.e. replacing American for Icelandic). Questions gauged individuals’ perceptions of the fairness, legitimacy, and justifiability of the prevailing social system. Participants rated the extent of their agreement with the items on a scale of -4 (strongly disagree) to +4 (strongly agree). Items were designed to measure social justification of the system (e.g. *In general, the Icelandic political system operates as it should; Our society is getting worse every year*- reverse-scored). Higher scores indicated increased levels of system justification. The scale has had good reliability in previous studies although it has never been tested in Iceland before (see for example, Kay & Jost, 2003; Jost & Kay, 2003).



After recoding the two reversed items an overall index was then calculated by taking the mean of responses to all eight items. For the structural equation analysis the error variance for this and subsequent scales was calculated using the following formula:  $(1-\alpha) s^2$  Reliability for this and all other scales along with descriptive statistics is reported in table 1.

*Social Dominance Orientation (SDO)*. A short version of the SDO scale Pratto et al., 2013) comprised of 4 items was used in this study. The short version has been tested cross-culturally with a weighted average  $\alpha$  reliability of .65. (Pratto et al., 2013). The question anchor was: “*There are many kinds of groups in the world: men and women, ethnic and religious groups, nationalities, political factions. How much do you support or oppose these ideas about groups in general?*” Participants then rated their support or opposition for group equality on a scale of 1 (extremely oppose) – 10 (extremely favour) to items such as *In setting priorities, we must consider all groups* (reverse scored); *We should not push for group equality*. After recoding the reversed items an overall index was then calculated by taking the mean of responses to all four items. Higher scores indicated greater endorsement of group inequality. For the structural equation analysis the error variance for this scale was calculated as before.

*Nature Human Overlap*. The measure, a graphical representation of the relationship between humans and nature, was comprised of 25 circles with each circle labelled with an ‘H’ for Humans and an ‘N’ for Nature. This measure was originally developed by Schultz (2000) and recently adapted and used in a study by Kashima, Paladino & Margetts (2014). Participants were asked to choose which circles best represented their thoughts about the relationship between Humans and Nature with a mouse click on the corresponding graphic. The circles differed in *distance* and *size* from each other (See figure 1). Size and distance represented the graphical measure’s two dimensions. The *distance* i.e. the degree of overlap between the circles had 5 different levels (Nature-Human Overlap: 5 levels) in a 5 x 5 factorial. The levels i.e. the degree of overlap between the circles ranged from no overlap (the first level) to complete overlap (the fifth level). The greater the overlap the closer to nature an individual perceives humans to be. In this study the error variance for this scale was fixed to 1 in all structural equation analyses. Higher scores indicated more psychological closeness to nature.

The second dimension was the *size* of the circles which represented the degree to which humans are greater than or above nature. This dimension also had 5 levels but had to be dropped from our analyses because it was not significant.

#### *Dependent variables*

*Private sphere behavioural intentions.* The private sphere behavioural scale was a new scale adapted from previous studies (McDonald, Fielding & Louis, 2012; Stern, et al., 1999; Whitmarsh & O'Neill, 2010) and included feedback from the cross-cultural study's contributors. Two clusters which emerged via factor analysis (see Appendix A) were used in our analyses. *Consumption* behaviour was comprised of six items and included green consumerism items (e.g. *buy environmentally friendly products*) as well as conservation items (e.g. *conserve water at home*). The second cluster *Energy* was composed of two energy conservation items (e.g. *turn off lights and appliances when not in use*). The scale ranged from 1 (*not at all likely*) to 5 (*very likely*) and included a "not applicable option"; only valid responses (i.e. applicable) were included in the analysis. An overall index was then calculated by taking the mean of responses to all items in each cluster and for the scale as a whole. Higher scores indicated more self-reported likelihood to engage in pro-environmental behaviour (i.e. behavioural intentions) in the next 12 months. For the structural equation analysis the error variance was calculated as before.

*Political Sphere Behavioural Intentions.* This 12 item list tapped into people's intentions to engage in political actions in the near future (e.g. likelihood of signing a petition in support of protecting the environment in the next 12 months). It is an extended version of the *environmental citizenship* scale (8 items) developed by Stern et al., (1999). The environmental citizenship scale was designed to measure non-activist behaviours in the public sphere that are pro-environment (e.g. voting for pro-environmental candidates) and not direct action (e.g. protesting) because Stern et al., 1999 found evidence of separate dimensions. The extended scale included four items two of which would classify as activism in Stern's (2000) classification (i.e. *volunteer to help an environmental group or event* and *join public demonstrations or protests supporting environmental protection*) and the other two involved "green talk" (Kashima et al., 2014) or the willingness to voice support for the environment in every day conversations or social media interactions.

We found evidence for two dimensions via factor analysis (see Appendix B) which we termed *passive political participation* (e.g. voting, signing petitions) and *active political participation* (e.g. protesting, volunteering for environmental causes).

The scale ranged for 1 (*not at all likely*) to 5 (*very likely*) and included a “not applicable” option but only valid responses (i.e. applicable) were included in the analysis. An overall index was then calculated by taking the mean of responses to all items in each cluster and for the scale as a whole. Higher scores indicated more self-reported likelihood to engage in pro-environmental political behaviour (i.e. behavioural intentions) in the next 12 months. For the structural equation analysis the scale’s error variance was calculated as before.

*Willingness to pay.* Stern (2000) found evidence for policy acceptance as a separate dimension of non-activist political sphere behaviour. This scale was comprised of 4 items adapted from the World Values Survey measuring individuals’ willingness to accept costly policies that would target climate change (e.g. *I would agree to an increase in taxes if the extra money was used to address climate change*). Participants were asked to rate their agreement to each item on a scale of -3 (strongly disagree) to +3 (strongly agree). After reverse coding one item an overall index was calculated by taking the mean of responses to all items where high scores indicated more willingness to accept costly policies to address climate change. For the structural equation analysis the scale’s error variance was calculated as before.

## **Results and discussion**

The means and standard deviations for all the variables used in the study are shown in Table 1. A few comments on the average scores and distributions are necessary. The average political orientation is more to the left which may reflect the characteristics of the sample comprised of younger, more educated people. It may also indicate some bias due to self-selection of the participants who chose to answer the questionnaire. Previous studies on nationally representative samples of Icelanders have found their average political orientation to be just right of centre (Thorisdottir, 2012).

The scores on the short version of the social dominance orientation scale were positively skewed despite the extended response scale. This is in line with previous research using the same scale finding the same skewed distribution results in many different countries (Pratto et al., 2012). Pratto and colleagues (2012) attributed the skewed distributions to a

general normative rejection of group hierarchy. This explanation could be also true of Iceland which can generally be described as a relatively egalitarian society (Olafsdottir, 2007).

Generally speaking, average scores on pro-environmental behavioural intentions are rather high except for active political participation and (to a lesser extent) acceptance of policy (measured by willingness to pay) where the scores are lower. This can be interpreted to indicate that more costly behaviours in terms of time, effort, money and even reputation (e.g. for non-normative political action) are not as widespread among the participants as more conventional political participation (e.g. voting, signing online petitions). However, willingness to pay could also be affected by sample characteristics as students tend not to be as financially secure as the general public.

Correlations between the study variables (see table 2) generally support the expected direction of the relationships between the independent variables and the different factors of pro-environmental behaviour. Nature human overlap's correlations with left/right orientation and system justification were not significant but the direction of the relationships is according to expectations.

#### *Multiple regression (MR) results*

To test whether different ideologies were predictive of different pro-environmental behavioural intentions as predicted in hypothesis 1 a series of multiple regressions was conducted. Table 3. lists results from five different multiple regressions for each behavioural factor. Using the enter method it was found that the four ideologies explain a significant but small amount of the variance in the private sphere factors: consumption,  $F(4, 325) = 14.86, p < .01, R^2 = .16$ , and energy,  $F(4, 325) = 9.45, p < .01, R^2 = .10$ . For the political sphere multiple regressions were also significant with more variance explained by the ideologies as expected. For passive political participation the ideologies explained a moderate proportion of the variance,  $F(4, 325) = 28.70, p < .01, R^2 = .26$ . Similarly for willingness to pay a moderate proportion of the variance was explained by the ideological factors,  $F(4, 325) = 27.57, p < .01, R^2 = .26$ . Finally, a somewhat weaker but still significant portion of the variance predicted by the ideologies emerged for the active political participation cluster,  $F(4, 325) = 18.26, p < .01, R^2 = .18$ . We, therefore, find support for our first hypothesis that the ideologies would be significantly predictive of all pro-environmental behaviours but more so in the political sphere (hypothesis 1) as the proportion of variance explained by the models indicates.

Overall, across most of the multiple regressions left/right political orientation emerged as the strongest predictor of behavioural intentions. An exception to this was the energy factor where it was non-significant and as such hypothesis 2a was only partially supported in the MR analysis. System justification was a non-significant predictor in nearly all the behavioural factors except the energy factor and as such we only found partial support for hypothesis 3a. Social dominance orientation was a moderate predictor for most of the factors except for active political participation and willingness to pay which supported hypothesis 4a but only partially hypothesis 4b. Hypothesis 4c was not supported since social dominance orientation was more predictive of the private sphere pro-environmental intentions than the political sphere ones contrary to our expectations. Finally, nature human overlap was a significant but weak predictor in two of the factors, consumption and willingness to pay which partially supports hypotheses 5a and 5b (see also table 3).

#### *Structural equation modelling results*

Structural equation modelling has the dual advantage of allowing us to test hypotheses simultaneously while accounting for measurement error. Even when fully aggregated models are used, as is the case here, it has been argued that it is still better to use latent variables in some way instead of not using them at all and assuming perfect measurement (Williams & O'Boyle, 2008). By testing our hypotheses (2a-5b) simultaneously we can see the relative importance of each predictor for each of the behavioural factors in each sphere. In our analysis, all variables (except for left/right orientation and nature human overlap) were treated as latent constructs, indicated by their scale means whose error term was fixed to  $(1-\alpha)s^2$  representing the unexplained scale variance. This was mainly done to reduce the number of parameters to be estimated relative to sample size while still accounting for measurement error (Coffman & MacCallum, 2005). Left/right orientation and nature human overlap were also treated as latent variables but with their error terms fixed to 1 for purposes of identification.

We tested two models, one for the private sphere pro-environmental behavioural intentions and one for the political sphere pro-environmental behavioural intentions. In both models the behavioural factors were tested simultaneously in each of the two categories of behaviour with the four ideologies serving as predictors.

### *Private sphere solution*

Figure 2 lists the results from the first model where we test simultaneously how the ideologies predict the two private sphere behavioural factors, i.e. consumption and energy. Modification indices indicated that four error terms between the ideologies should be allowed to correlate to improve model fit (see figure 2). Theoretically, there is good reason for the ideologies to be related to each other as explained in the introduction. For example, correlated error terms between nature human overlap and social dominance orientation are well-supported by theory as were the other error correlations (see also introduction).

Mardia's coefficient which was over 5.00 indicated that the data was non-normally distributed (Bentler, 2005). Robust Maximum Likelihood (RML) was used as the estimation because it has been found to perform better when the assumption of normality is violated but without requiring very big sample sizes as with, for example, the Weighted Least Squares Method of Estimation (WLS) (Mindrila, 2010). Using Kline's (2011) criteria, the model had acceptable fit indices:  $S-B\chi^2(3) = 6.74$ , *ns*; SRMR = .05, RMSEA=.06 (90% CI = .00 - .12), CFI= .98, NFI= .97. Although the lower bound of the RMSEA confidence interval is 0 indicating very good fit, the upper bound is higher than the recommended level for a good fitting model. Such mixed results are usually due to small samples and a larger sample may be necessary to obtain more accurate results in the future. Another more likely reason for the mixed results could be that the model is not very complex and RMSEA has been found to favour more complex models (Kline, 2011).

With these reservations in mind, we can now move on to the factor loadings in the model. Nature human overlap was not a significant predictor of the energy factor which is also in line with the multiple linear regression results and not surprising as such. Hypothesis 5a is then partially rejected, as nature human overlap was only a significant predictor of the consumption cluster. It is not a particularly surprising result as previous studies have shown that pro-environmental values and worldviews have weak and indirect effects on pro-environmental intentions. It is also likely that biocentric values are more salient in the purchase of goods and in waste disposal than in energy conservation in Iceland. Energy conservation from the public sector is, in fact, less consequential for the environment in Iceland than it is abroad due to the nearly 100% proportion of renewable energy used and the fact that the proportion used by the public sector is miniscule compared to the industrial sector (National Energy Authority, 2013). Although, not many may be aware of the industrial sector's actual levels of energy consumption most are aware that the energy they personally

use is “clean and green“. As such it is not surprising that a biocentric worldview such as nature human overlap should not figure largely in household energy conservation in Iceland.

All other predictors were significant and the relationships were in the expected direction supporting all hypotheses relating to the private sphere i.e. hypotheses 2a, 3a and 4a. Social dominance orientation emerged as the strongest predictor while left/right orientation and system justification had moderate effects on the two private sphere behavioural factors (see figure 2).

It is somewhat surprising that social dominance orientation was a stronger predictor of the behavioural factors than the other two political ideologies. It might reflect the increased discussion in recent years of consumption (of both products and energy) in the rich North being disproportionate to consumption in the poor South. In fact, many environmentalist non-profit organizations and the UNFCCC recognise that historical emissions of greenhouse gasses have disproportionately benefited the developed North while at the same time the poorest nations in the world are the most vulnerable to climate change impact (UNFCCC, 2014). This global inequality frame has been quite prominent in the climate change discourse in Iceland as elsewhere. As such, it is likely that the more legitimate one thinks (global) group inequality is the more reactive one might be to changes in one's lifestyle that aim to reduce it, even relatively easy ones like the ones measured here.

However, the way that social dominance orientation is measured, i.e. by not specifying in advance which particular groups the questions pertain to, limits the interpretation of the results as different respondents will have different groups in mind. Although speculative it is likely that climate change primes people in Iceland to the global inequality frame since local inequalities have not been prominent in the climate discourse in Iceland. Climate change has generally not been discussed in the context of inequalities within the country and little research has been done to investigate potentially disproportionate socioeconomic effects of climate change impacts on different human populations within Iceland (e.g. urban versus rural areas) (Ingolfssdottir, 2011).

#### *Political sphere solution*

The second model tested the ideologies against the two political sphere pro-environmental behavioural intentions' factors i.e. passive political participation, active political participation and then policy acceptance i.e. willingness to pay testing hypotheses 2b - 5b. The data did not

deviate much from a normal distribution and as such the ML estimation method was deemed appropriate.

Modification indices indicated that four error terms between the ideologies should be allowed to correlate to improve model fit. Note that these were the same error terms as for the private sphere solution. Using Kline's (2011) criteria the model still had rather poor fit indices even after modification:  $\chi^2(5) = 21.27, p < .01$ ; RMSEA = .10 (90% CI = .06 - .14), SRMR = .07; NFI = .97, CFI = .97. Although both the CFI and NFI indices indicate good fit, the chi-square is significant and the RMSEA is too high with even the lower limit of its confidence interval higher than .05 and the upper limit well over the usually recommended .08. Finally, SRMR is also above the .05 level which is what is often deemed acceptable (Kline, 2011). Modification indices indicated further error correlations but those were not deemed appropriate from a theoretical standpoint. There was, however, a logical explanation for the ill-fitting model since it contained three non-significant pathways.

As such, the three non-significant paths were dropped following modification indices to improve model fit. In addition three cases with the largest contribution to multivariate kurtosis were removed. Finally, the four error terms between the ideologies were also allowed to correlate as before. This resulted in a better fitting model, shown in Figure 3. The fit indices were acceptable:  $\chi^2(8) = 23.36, p < .01$ ; RMSEA = .07 (90% CI = .04 - .12), SRMR = .07; NFI = .96, CFI = .97. The chi-square is significant which tends to happen more often with samples larger than  $N = 200$ . The RMSEA indicates moderate fit with its lower confidence limit at an acceptable level. The higher confidence limit exceeds the .08 limit that is generally deemed acceptable which means that we cannot be completely confident of our results. The SRMR is also rather high but not excessively so. The NFI and CFI both indicate good fit (Kline, 2011).

With these reservations in mind we can move on to the factor loadings in the improved model. Left/right political orientation still emerged as the most important predictor as was the case in the multiple regressions, where more right-leaning participants were less likely to report intentions to participate in all the behavioural factors within the political sphere, again supporting our hypothesis (hypothesis 2b). As can be seen from figure 3 the factors loadings for left/right orientation range from -.71 to -.81 and are highly significant which indicates that political orientation has a strong effect on participants' pro-environmental political intentions when controlling for the effects of the other ideologies. The fact that left/right orientation is a



stronger predictor in all political behaviour factors is likely due to the fact that the left and right in Iceland is based more on economic than social issues (Thorisdottir, 2012) and environmental issues in Iceland have been historically conceptualized as trade-offs between economic development versus nature protection (Benediktsson, 2014).

System justification was negatively related to both passive and active political participation but was not related significantly to willingness to pay which means partial support for hypothesis 3b, contrary to the MR analyses which found no significant relation between system justification and political sphere behavioural intentions. In other words, those who tend to believe that the social system is just and fair are less likely to report intentions to participate in either passive or active political action.

As was noted in the method section system justification was measured with the social system justification scale (Kay & Jost, 2003). Willingness to pay as a measure of policy acceptance may be more related to justification of the economic system rather than the social system. As such, it is likely that the economic version of the system justification scale (Jost & Thompson, 2000)<sup>2</sup>, which we did not use in this study, would have been a significant predictor of willingness to pay. Another explanation could be simply that students who usually have a more insecure income may be generally less willing to endorse costly policies. Granted these arguments are speculative and would need further research.

Social dominance orientation was a moderate predictor of passive political participation intentions and willingness to pay and a weak predictor of active political participation intention supporting hypothesis 4b. Thus, as with the private sphere intentions, those who tended to believe in the legitimacy of inequality also tended to report lower intentions to participate in political action which would have to address these inequalities. Similarly, with willingness to pay, those who tended to endorse inequality were also less likely to accept costly policies to address climate change and in part the socioeconomic inequalities that have been associated with climate change.

Finally, nature human overlap was a small but significant predictor of willingness to pay when controlling for the other ideologies. In other words, the more an individual feels

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<sup>2</sup> Designed to assess the “tendency to accept economic inequality” (Jost & Thompson, 2000, p.225) with items such as: “*There are many reasons to think that the economic system is unfair*” and “*Economic differences in the society reflect an illegitimate distribution of resources*”.

psychologically close to nature the more likely she is to report intentions to accept costly policies to address climate change. However, nature human overlap was not significant for two of the behavioural factors, passive and active political participation, respectively and as such we have only partial support of hypothesis 5b. It is, however, also possible that this measure does not capture the construct of psychological closeness to nature well-enough. Nature human overlap is, after all, a relatively new measure with unclear psychometric properties. The NEP, a reliable and widely used scale (Dunlap, 2008), for which it is also possible to calculate a reliability coefficient, might be a better choice in future studies.

### **Conclusion**

Our hypotheses were largely supported as regards the significance and relative strength of the associations as revealed by the multiple regression analyses. As regards the specific contributions of each ideology to each behavioural factor the results were more mixed but, nonetheless, for the most part supportive of our hypotheses which were tested through structural equation modelling.

The present study, thus, shed some light on the influence of ideologies and worldviews on pro-environmental behavioural intentions in the private and political sphere in Iceland. We were limited in our choice of variables in this study being as it was part of a larger cross-cultural project designed to address different theoretical concerns. Nonetheless, there is some indication that ideologies do play a role in pro-environmental behavioural intentions and future studies could look into these relations in a more fine-grained and theory-driven manner. We recommend using both the social and economic versions of the system justification scales as well as a more valid measure to capture biocentric sentiments.

It should also be kept in mind that sample characteristics may have skewed the picture a bit as our sample consisted of relatively young and more educated people. Finally, in our study we investigate behavioural *intentions* rather than actual behaviour. Although intentions can inform us about the relation of various psychological variables to various behaviours it is important to be aware of the fact that there may be a gap between self-reported intentions to act and actual behaviour (Kennedy, Beckley, McFarlane & Nadeau, 2009). In addition, behavioural intentions often do not reflect the actual environmental impact of people's preferred behaviours (Whitmarsh, 2009).

Although ideologies and worldviews do not provide the full picture of inaction as relates to climate change there is sound theoretical and empirical justification that they account for at least some of it and should figure in the explanation. In addition, awareness of the influence of ideologies and worldviews is integral in the design of public information and persuasion campaigns and how we choose to frame climate change in the public discourse (Kahan, 2013). Even in relatively benign issues such as the environmental labelling of products it is possible to discern an influence of ideologies and worldviews (Gromet, Kunreuther & Larrick, 2013) and future labelling attempts might take this insight into account. In addition, previous studies have found support that promoting system-sanctioned change may be a more effective method of persuasion when dealing with system threatening problems such as climate change (Feygina, Jost and Goldsmith, 2010; Feygina, Goldsmith & Jost, 2010). Finally, as this research report and others before it indicate, ideological concerns and worldviews cannot be ignored because “the questions about climate change that really matter will not be settled by scientific facts. They entail debates about values and about the forms of political organisation and representation that people believe are desirable” (Hulme, 2014, para. 14).

Table 1. Descriptive statistics and reliabilities of study variables

Variables	<i>M</i>	<i>SD</i>	<i>α</i>
Left/Right Orientation	4.2	1.9	-
System Justification	-1.0	1.4	.83
Social Dominance	2.1	1.4	.83
Nature Human Overlap	4.2	1.0	-
Consumption	4.0	0.8	.82
Energy	4.1	1.0	.67
Passive political participation	3.5	1.1	.89
Active political participation	2.3	1.0	.90
Willingness to pay	0.4	1.4	.82

*Note.* *N*=365

Table 2. Correlations between study variables.

Variables	1	2	3	4	5	6	7	8	9
1.Left/Right Orientation	-								
2.System Justification	.21 <sup>***</sup>	-							
3.Social Dominance	.31 <sup>***</sup>	.15 <sup>**</sup>	-						
4.Nature Human Overlap	-.10 <sup>ns</sup>	-.10 <sup>ns</sup>	-.28 <sup>***</sup>	-					
5.Consumption	-.29 <sup>***</sup>	-.19 <sup>**</sup>	-.30 <sup>***</sup>	.20 <sup>***</sup>	-				
6.Energy	-.20 <sup>***</sup>	-.19 <sup>**</sup>	-.27 <sup>***</sup>	.13 <sup>*</sup>	.53 <sup>***</sup>	-			
7.Passive political participation	-.46 <sup>***</sup>	-.20 <sup>**</sup>	-.32 <sup>***</sup>	.17 <sup>**</sup>	.65 <sup>***</sup>	.36 <sup>***</sup>	-		
8.Active political participation	-.42 <sup>***</sup>	-.15 <sup>**</sup>	-.17 <sup>**</sup>	.13 <sup>*</sup>	.51 <sup>**</sup>	.23 <sup>***</sup>	.77 <sup>***</sup>	-	
9.Willingness to pay	-.46 <sup>***</sup>	-.07 <sup>ns</sup>	-.29 <sup>***</sup>	.21 <sup>***</sup>	.42 <sup>**</sup>	.26 <sup>***</sup>	.64 <sup>***</sup>	.59 <sup>***</sup>	-

Note.  $N = 365$ . \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ; two tailed.

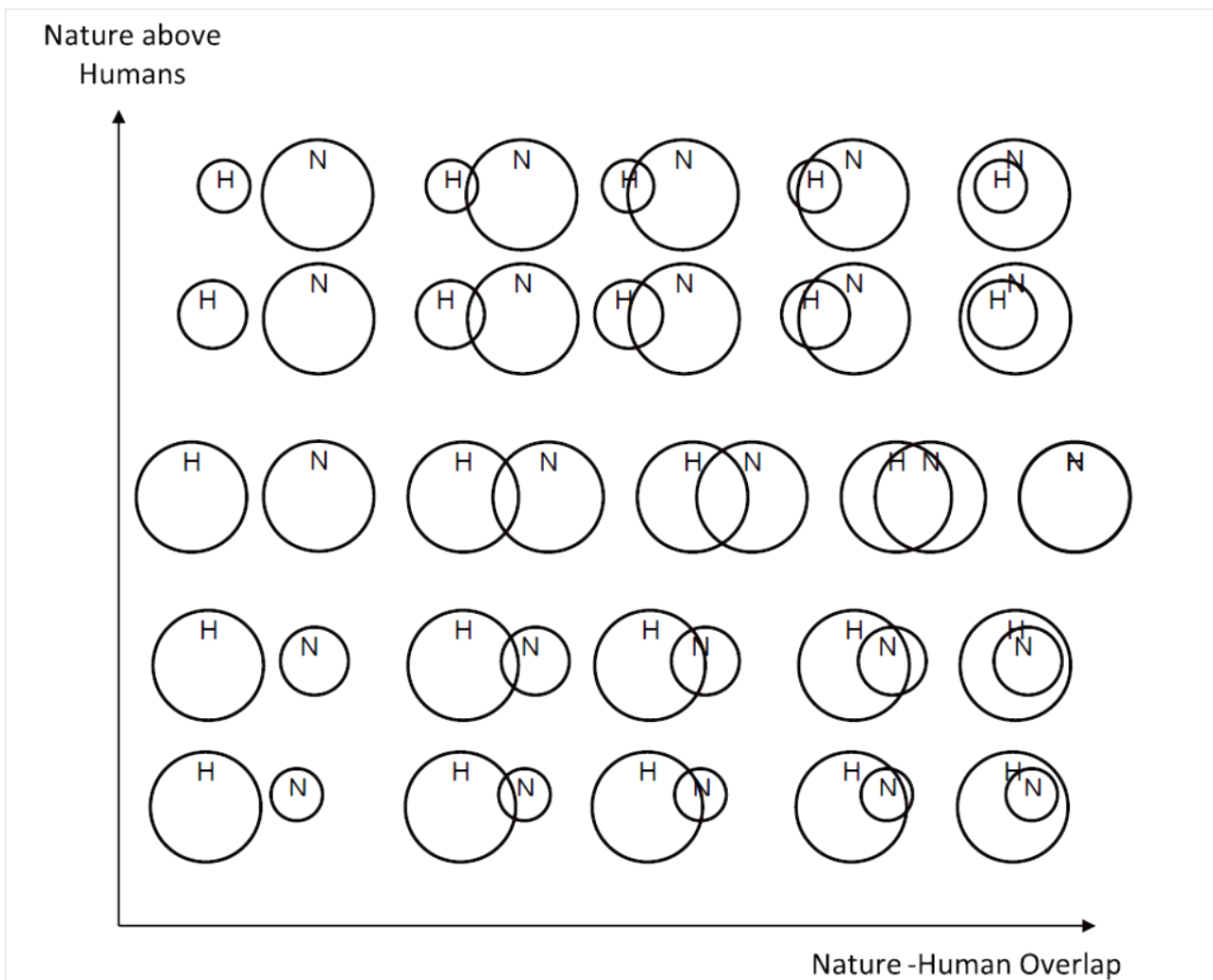


Figure 1. Graphical measure of human nature relationship.

Note: Participants were given the following instructions: “Many cultures have long histories of thinking about what it means to be human and humans’ place in the universe. Although this is often considered a question for philosophers, it is also a question many of us may think about sometimes. We are interested in finding out your thoughts about humans’ place in nature. In the picture below, a circle marked “H” represents Humans and a circle marked “N” represents Nature. The size of each circle represents the importance of Humans or Nature; the overlap between circles represents how close they are. Which of the following depictions best represents your thoughts about the relationship between Humans and Nature? Please click on your choice.” The arrowed dimensions and their labels were not presented to the participants. (See also, Kashima et al., 2014).

Table 3. Multiple regressions between study variables and behavioural factors.

Variables	Consumption			Energy			Passive political participation			Active political participation			Willingness to pay		
	<i>B</i>	<i>SE</i>	<i>β</i>	<i>B</i>	<i>SE</i>	<i>β</i>	<i>B</i>	<i>SE</i>	<i>β</i>	<i>B</i>	<i>SE</i>	<i>β</i>	<i>B</i>	<i>SE</i>	<i>β</i>
Left/Right	-.08	.02	<b>-.20<sup>***</sup></b>	-.05	.03	-.10 <sup>ns</sup>	-.22	.03	<b>-.38<sup>***</sup></b>	-.23	.03	<b>-.39<sup>***</sup></b>	-.32	.04	<b>-.42<sup>***</sup></b>
System Justification	-.06	.03	-.10 <sup>ns</sup>	-.09	.04	<b>-.13<sup>*</sup></b>	-.07	.04	-.09 <sup>ns</sup>	-.04	.04	-.05 <sup>ns</sup>	.05	.05	-.05 <sup>ns</sup>
Social Dominance Orientation	-.11	.03	<b>-.18<sup>**</sup></b>	-.14	.04	<b>-.20<sup>**</sup></b>	-.13	.04	<b>-.17<sup>**</sup></b>	-.01	.04	-.02 <sup>ns</sup>	-.14	.05	-.14 <sup>ns</sup>
Nature Human Overlap	.09	.04	<b>.12<sup>*</sup></b>	.04	.05	-.05 <sup>ns</sup>	.08	.05	.08 <sup>ns</sup>	.08	.05	.08 <sup>ns</sup>	.19	.07	<b>.14<sup>**</sup></b>

*Note:* *N*=326. \**p* < .05; \*\**p* < .01; \*\*\**p* < .001, two-tailed.

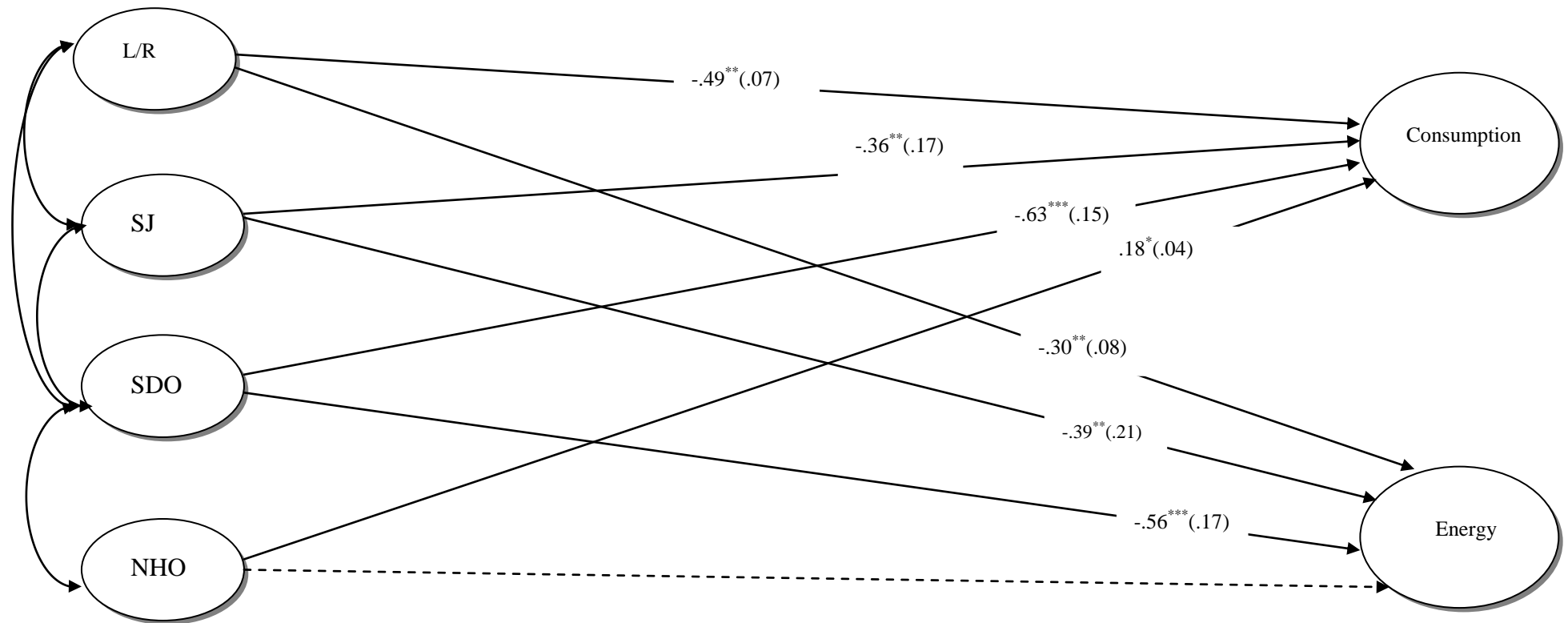


Figure 2. Private sphere solution.

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , one tailed. The figure shows standardized coefficients with standard errors in parentheses. Error terms and disturbances not included for clarity. Arrows between predictors indicate error terms that were allowed to correlate after modification. Dotted line indicates a non-significant pathway.



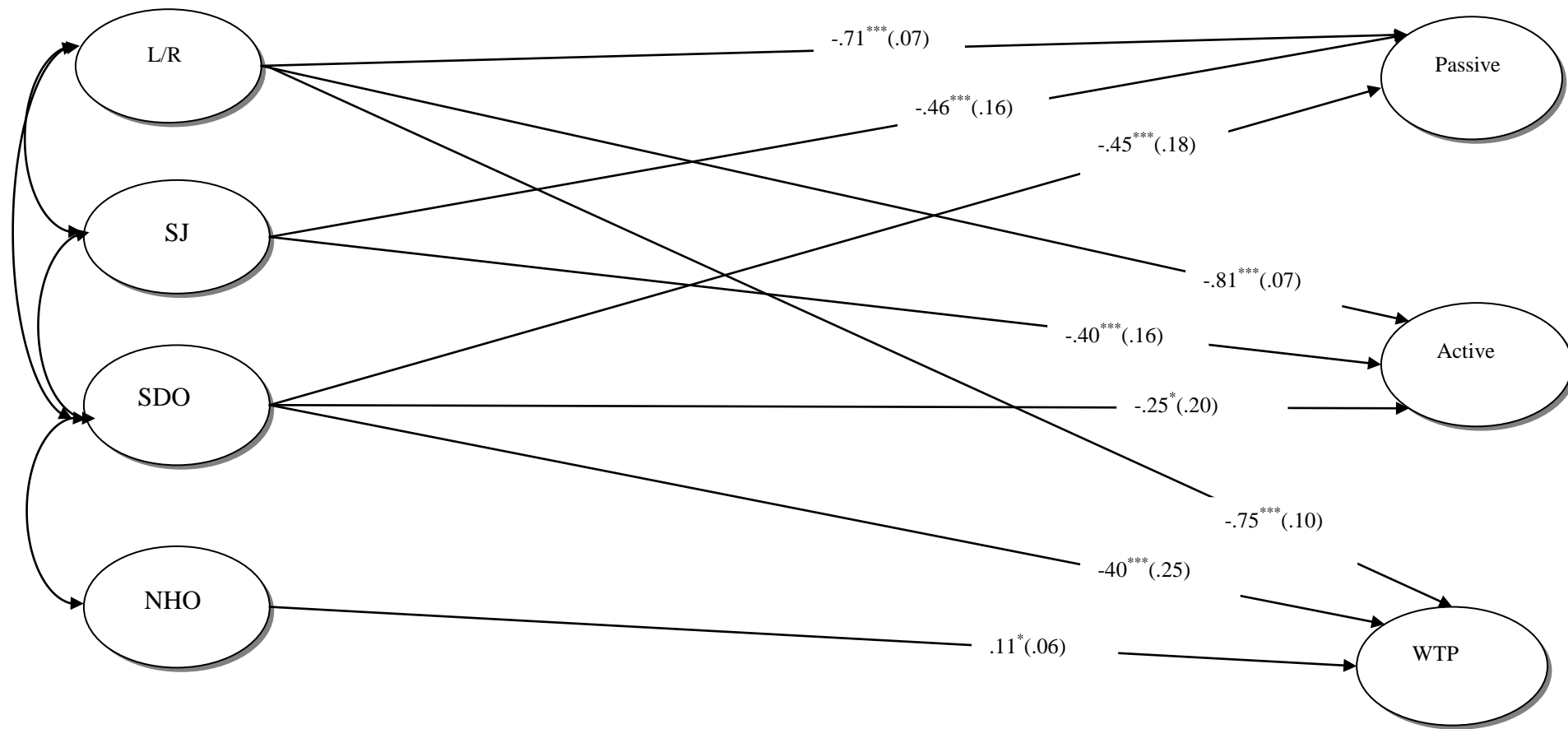


Figure 3. Political sphere solution with non-significant paths deleted.

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; one tailed. The figure shows standardized coefficients with standard errors in parentheses. Error terms and disturbances not included for clarity. Arrows between predictors indicate error terms which were allowed to correlate after modification.

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## Appendix A: EFA for the private sphere behavioural intentions scale

A principal components analysis was conducted on the 12 items. Theoretically, we could not be sure whether the factors would be correlated (see discussion on pro-environmental behaviours in the introduction) but oblique rotation revealed moderate correlations between two of the factors. As such, the final analysis used oblimin rotation. Preliminary analysis revealed that one item would have to be removed (i.e. *Avoid or reduce eating meat*) due to its low communality as well as a clear indication of a floor effect since nearly 45% of the participants indicated that they would not be at all likely to engage in this behaviour. This is not surprising and was expected since there is a trade-off between local meat consumption and massive imports of vegetables in Iceland and it is not clear which is more environmentally-friendly. It may, however, also reflect cultural effects as food consumption, in general, and meat consumption, in particular, tends to be a very culturally embedded practice (cf. Møhl, 2000). One more item (i.e. *Minimize use of air-conditioning or heating*) had to be removed for cross-loading on two factors likely due to ambiguous wording since in the Icelandic context it can be interpreted as both a household and car-related action. That left 10 out of the initially 12 items for further analysis.

The Kaiser-Meyer-Olkin measure of sampling adequacy was .86 above the recommended value of .6 and all KMO values for individual items were well above .5. Bartlett's test of sphericity was significant  $\chi^2(45) = 1014,756, p > .001$  indicating sufficiently large correlations for a principal components analysis. Table 1. below lists the factor loadings and communalities for the final solution and table 2. lists descriptive statistics and reliabilities for the three extracted factors. Note that in the research report we only use two of the factors in our analysis (i.e. Consumption and Energy) because preliminary analysis revealed that Transport had no significant relation to our predictors. The three factors explained approximately 64% of the variance in the data.

Table 1. Factor loadings based on principal components analysis with oblimin rotation for 10 items from the private sphere behavioural intentions scale ( $N = 365$ )

Item	Factor loadings			
	Consumption	Transport	Energy	Communalities
Buy environmentally-friendly products	.89			.80
Install products to save energy (e.g., low-energy light bulbs)	.78			.67
Buy products with less packaging	.77			.62
Recycle	.72			.60
Eat food which is locally-grown or in season	.57			.46
Conserve water at home (e.g., when cooking or showering)	.52			.47
Reduce car travel (e.g., walk, cycle, use public transport)		.86		.77
Use car-sharing or car-pooling schemes		.67		.62
Turn off lights and appliances when not in use			.76	.69
Turn off electrical equipment rather than use “standby” mode			.74	.72

*Note.* Factor loadings under .40 suppressed.

Table 2. Descriptive statistics for the two political participation factors ( $N = 365$ )

	No. of items	$M (SD)$	Skewness	Kurtosis	$\alpha$
Consumption	6	4.0 (0.8)	-.77	.02	.82
Transport	2	3.6 (1.0)	-1.1	-.28	.42*
Energy	2	4.1 (1.0)	-.61	.72	.51*

*Note.* \* reported correlations.

## Appendix B: EFA for the extended environmental citizenship scale

A principal axis factoring was conducted on the 12 items with oblimin rotation. The Kaiser-Meyer-Olkin measure of sampling adequacy was .95 well above the recommended value of .6 and all KMO values for individual items were well above .5. Bartlett's test of sphericity was significant  $\chi^2(55) = 2652,339$ ,  $p > .001$  indicating sufficiently large correlations for a principal axis factoring analysis. Oblimin rotation was chosen because it was theoretically reasonable to expect the factors to be interrelated. Table 1. below lists the factor loadings and communalities for the final solution and table 2. lists descriptive statistics and reliabilities for the two extracted factors. The two factors explained approximately 68% of the variance in the data.

Table 1. Factor loadings based on principal axis factoring with oblimin rotation for 12 items from the extended environmental citizenship scale ( $N = 365$ )

Item	Factor loadings		Communalities
	Passive Political Participation	Active Political Participation	
If a local, state or Federal election was called, vote for a candidate at least in part because he or she was in favour of strong environmental protection	.97		.79
Speak in favour of pro-environmental policies in conversations with your friends or family	.80		.70
Sign a petition in support of protecting the environment	.69		.62
Boycott companies that are not environmentally friendly	.62		.60
Post pro-environmental messages or links on social media (e.g., Facebook, Twitter)	.61		.68
Read a newsletter, magazine or other publication written by an environmental group	.48		.55
Write a letter or call your member of Parliament or another government official to support environmental protection		.89	.75
Write to newspaper in support of protecting the environment		.81	.71
Volunteer to help an environmental group or event		.65	.68
Join or renew membership of an environmental group		.60	.79
Give money to an environmental group		.60	.57
Join public demonstrations or protests supporting environmental protection		.51	.71

*Note:* Factor loadings under .40 suppressed.



Table 2. Descriptive statistics for the two political participation factors ( $N = 365$ )

	No. of items	$M(SD)$	Skewness	Kurtosis	$\alpha$
Passive Political Participation	6	3.5 (1.1)	-.55	-.60	.89
Active Political Participation	6	2.3 (1.0)	-.56	-.56	.90