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SOCIAL MODEL OF ENVIRONMENTAL ACTION: THE INFLUENCE OF VALUES, BELIEFS, AND NORMS ON INDIVIDUAL, PUBLIC, AND COLLECTIVE PRO-ENVIRONMENTAL BEHAVIOUR

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PRO-ENVIRONMENTAL BEHAVIOUR

by

Natalia Koustova

A Dissertation

Submitted to the Faculty of Graduate Studies

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ABSTRACT

An effective climate action strategy requires rapid reduction of consumption at both the individual and aggregate levels. The present paper proposes a social model of environmental action (SMEA) based on both individual and collective behavioural theories currently used to explain pro-environmental behaviour. A survey was conducted on Amazon Mechanical Turk (N=485) to examine Americans' cultural worldviews, values, beliefs, norms, and self-reported pro-environmental behaviours. The proposed model was partially supported: social dominance orientation, self-transcendence values, and injunctive and descriptive norms influenced pro-environmental behaviour indirectly via individual and group efficacy beliefs. In addition, it was found that social norms also influence behaviours directly. Contrary to the hypotheses, self-construals were not related to efficacy beliefs or pro-environmental behaviour. Overall the SMEA had adequate model fit and explained more variance than the three other models (values-beliefs-norms, theory of planned behaviour, and social identity model of collective action). This model has implications for addressing climate change as a collective action problem, which encourages individuals to think of collective, rather than individually based solutions. The model has potential to apply across cultures as it accounts for social factors in addition to personal values, and uses a broader conceptualization of what is considered pro-environmental behaviour.

DEDICATION

"My friends,

Love is better than anger.

Hope is better than fear.

Optimism is better than despair.

So let us be loving, hopeful, and optimistic.

And we'll change the world."

- Jack Layton

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The effects of climate change are starting to be observed around the globe, including bleaching of the Great Barrier Reef (Schiffman, 2017), melting permafrost (Berwin, 2017), and record global surface temperatures (Doyle, 2017). Climate change is the "change over time in the averages and variability of temperature, precipitation, wind, as well as associated changes in the Earth's atmosphere, oceans, snow and ice, land surface, ecosystems, and living organisms" (American Psychological Association [APA], 2013, p. 6). Its effects on the environment include increased weather volatility, glacial melting, forest fires, droughts, heat waves, increased precipitation, ocean acidification, and decrease in biodiversity. For humans, these effects will lead to forced relocation, food shortages, accelerated spread of disease, reduced availability of fresh water, and increased rate of mortality from air pollution and heat stroke (APA, 2013; Intergovernmental Panel on Climate Change [IPCC], 2014; Organization for Economic Cooperation and Development [OECD], 2012).

Since the beginning of the industrial era global average surface temperature has risen by 0.99°C, Arctic sea-ice has lost an average of 13% mass per decade, and sea level has risen by 0.27 meters – the highest rate in two millennia (NASA, 2016). These observed rapid changes are attributed to the high concentration of greenhouse gasses in the atmosphere, which have risen to the highest level in 800,000 years, and 78% of which are a direct result of fossil fuel combustion and industrial processes (IPCC, 2014). It is extremely likely that more than half of the observed increase in global average surface temperature is caused by these increased emissions (IPCC, 2014).

Climate scientists and environmental activists are calling this "decade zero" for climate action, as time for mitigation is quickly running out (Klein, 2014; Nuccitelli, 2016). At the 2015 climate conference in Paris (COP 21), 195 countries agreed to contain global temperature rise to a hard target of 2°C and an aspirational target of 1.5°C by the year 2100 (Center for Climate and Energy Solutions, 2015). A target of 2°C is controversial in itself as it would leave many of the poorest communities under water (Klein, 2014). However, the sum of actual emission reduction pledges of participating COP 21 nations commits the world to a 2.7°C rise (McKie, 2015) and the recent withdrawal of the United States from the agreement makes achieving a 2°C target even less likely as the US is the second largest emitter of greenhouse gases in the world (Plumer, 2017). Due to the current state of affairs, experts say it is likely the world will be faced with a rise in temperature that will cross a natural tipping point causing a cascade of unpredictable and catastrophic changes to the environment that cannot be stopped (IPCC, 2014). Since governments are not acting fast enough, citizens of all countries are becoming more actively engaged in influencing their governments' efforts to ramp up national commitments.

Economically developed countries in North America, Europe, Australia, and Japan have contributed the majority of worldwide emissions to date (OECD, 2012). Even though total emissions from OECD countries are projected to drop, they must do so radically as emerging economies such as Brazil, Russia, China, India, Indonesia, and South Africa are projected to increase their energy use in the coming decades. In addition to direct emissions, OECD countries export emissions by moving resource intensive operations such as manufacturing, extraction, and difficult to recycle garbage to

less-wealthy countries, and by transporting products made in emerging economies back to the developed nations without having to include them in emission estimates (Goldenberg, 2014).

Industries including food, energy, and transportation pollute the environment through waste, extraction, and overproduction. Many products are made from oil and its by-products. They tend to be single-use, non-biodegradable, increasingly poor in quality, and made to perpetuate continuous consumption (Boghara, 2010). Since virtually every action in the daily lives of individuals in economically developed cultures either directly or indirectly contributes to the production of greenhouse gases, effective emission reduction strategy requires rapid reduction of consumption at both individual and aggregate levels. A great deal of literature addresses the antecedents of individual pro-environmental behaviour (Bamberg & Möser, 2007; Hines, Hungerford, and Tomera 1986/87; Thøgersen, 2014). However, individuals who try to change their personal behaviour to be more environmentally sustainable within a culture that promotes and rewards consumption may find they are fighting a constantly uphill battle. Public and collective behaviours that can help address these social and cultural barriers have received less attention from scholars, even though a combination of actions is needed to address such a complex problem.

In the present research, culture is defined as a set of common tools that allow groups to share a social reality and in which shared knowledge is encoded, making culture a set of cognitions that are distributed among individuals (Smith & Semin, 2004). Culture provides an operational range within which individuals can successfully interact with others. Acting outside this operational range can isolate the individual (Clark,

1995), limiting the success of his or her behaviour change and the ability to influence others. Cultural cognitions such as individualism-collectivism and power distance (or social hierarchy) define the size of the circle of important others who are included in one's self-definition, and the perception of equality or superiority of some people over others. Culture exerts influence on behaviour on a fundamental psychological level that affects how individuals relate to others and whether they are willing and/or able to cooperate with one another for a broader social goal such as a clean environment.

The present paper proposes a social model of environmental action (SMEA) based on three established theoretical models: values-beliefs-norms theory (VBN), the theory of planned behaviour (TPB), and the social identity model of collective action (SIMCA). The proposed model addresses the limitations of previous models with the addition of social norms which define behaviour considered appropriate and desirable by the group; and cultural cognitions of *individualism-collectivism,* defined as the view that individuals are either independent of one another or part of a collective, and *power distance,* the degree to which inequality is acceptable in a society. The social model of environmental action (SMEA) proposes that these cultural worldviews, values, and norms influence behaviour via individual and group efficacy beliefs.

CHAPTER II

REVIEW OF LITERATURE

It has been a challenge for the field to develop a specific or definitive set of pro-

environmental behaviours as these behaviours are highly varied and context dependent.

For example, driving less assumes availability of public transit infrastructure, without

which reducing the use of personal vehicles is impossible. Adding to the complexity,

some pro-environmental behaviours may have positive environmental effects, but may

not be intended for that purpose – for example buying locally produced products could be

rooted in anti-globalist beliefs that have nothing to do with preserving the environment or

reducing the effects of climate change, but nevertheless contribute to reducing

environmental impact. There are actions such as protesting genetically modified food,

which some individuals pursue with intended environmental purpose (Asis, 2016) though

some scientists argue that GMO foods could actually help us mitigate climate change

(Heikkinen, 2016; Mahaffey, Taheripour, & Tyner, 2016). Some individuals may act

pro-environmentally only if the issue directly affects them, such as if they live in a flood

area, rather than for altruistic reasons. In contrast, some individuals engage in anti-

environmental behaviours such as purposely wasting or polluting resources – behaviours

that are linked to antisocial tendencies (Corral-Verdugo, Frais-Amenta, & Gonzalez-

Lomelí, 2003). However, little research is available exploring anti-environmental

behaviour and its relationship to pro-environmental behaviour.

However, some attempt to define or classify behaviours has been made. Studies

of pro-environmental behaviour have distinguished between individual, public, and

collective behaviours. *Individual pro-environmental behaviours* include a wide variety

of behaviours such as: household heating, cooling, waste, transportation, green

consumerism, willingness to sacrifice, recycling, biking or reducing car use, using

unbleached paper, taking shorter showers, turning off the lights, buying green products,

being willing to pay for the preservation of national parks, flying less, reducing meat

consumption, and many others. However, there is not a specific set of identified

individual behaviours that are considered as a repertoire across studies, and different

studies tend to use different indicators. At the aggregate level, people can participate in

public and collective pro-environmental action, including information sharing, social

movement participation, signing petitions, joining organizations, supporting public

policy, and making change through one's organization or profession (Stern, 2000).

However, different studies disagree on which behaviours are classified as public and

which as collective. Overall, public and collective pro-environmental behaviours are not

as prominent in the literature, and tend to be defined in terms of petition signing, political

participation, or being part of an environmental group.

Despite the difficulties in conceptualization of pro-environmental behaviour,

several psychological models have been applied to the study of its antecedents. Patchen

(2010) identified three common frameworks that are used to study individual pro-

environmental behaviour: norm activation model (NAM, Schwartz, 1977), value-belief-

norm theory (VBN, Stern, 2000), and the theory of planned behaviour (TPB, Ajzen,

1991).

Individual Models of Pro-Environmental Behaviour

Norm activation and value-belief-norm theories. The most basic model NAM,

states that *awareness of consequences* (AC) and belief in personal responsibility, activate

personal norms (which will be referred to as *perceived obligation* from here on to avoid confusion with other norms), which determine altruistic behaviours such as pro-environmental behaviour (Bamberg & Möser, 2007; Blamey, 1998; Nordlund & Garvill, 2002; Stern, 2000). The VBN theory subsequently added *individual values* to NAM, which the team of researchers considered to be the main motivators of pro-environmental behaviour (see Figure 1; Stern, 2000). *Values* are motivational constructs that outline desirable end states or behaviours (Schwartz & Bilsky, 1987). Schwartz (1990, 2010) proposed 10 universal values clustered into four categories: traditionalism values, which are on the opposite end of a continuum to openness values, and self-enhancement values, which are the opposite of self-transcendence values. According to the VBN theory the self-enhancement vs. self-transcendence continuum (which they further break down into biospheric, altruistic, and egotistic values) influences ecological worldview (NEP, also referred to as *environmental concern*), awareness of consequences (AC), and perceived ability to reduce threat (AR, which from here on will be referred to as *personal efficacy*). These beliefs activate the perceived obligation (PO) to behave in pro-environmental ways.
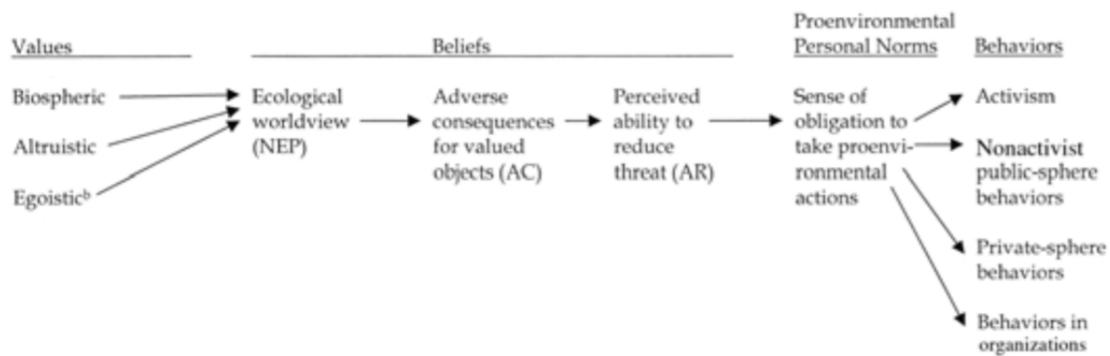
Figure 1. Values-beliefs-norms theory (Stern, 2000, p. 412)

Stern, Dietz, Abel, Guagnamo, and Kalof (1999) tested the model's ability to predict three different types of behaviour: private individual behaviour, willingness to sacrifice, and environmental activism (collective action/protesting). They found the model worked for individual level behaviours and willingness to sacrifice, but not for activism. Since then, other studies used the VBN theory to predict consumer behaviour, intention to use renewable energy, adoption of eco-innovation, personal norms of using sustainable transportation, support for pro-environmental policies, and conservation behaviours at work (Fornara, Pattitoni, Mura, & Strazzera, 2016; Jansson, Marell, & Nordlund, 2011; Lind, Nordfjærn, Jørgensen, & Rundmo, 2015; Scherbaum, Popovich, & Finlinson, 2008; Steg, Dreijerink, & Abrahamse, 2005). The theory has also been validated cross-culturally with samples in Taiwan (Chen, 2015), Argentina (Jakovcevic & Steg, 2013), and Chile and Germany (Menzel & Bögeholz, 2010).

Although this theory predicts individual pro-environmental behaviour, many studies point to its incompleteness. In particular, it does not address social factors such as the influence of important others, is often combined with other constructs or theories to improve its predictive ability, and is better at predicting intentions than actual behaviours.

Theory of planned behaviour. The theory of planned behaviour (TPB) postulates that pro-environmental intentions and behaviours are predicted by environmental attitudes (same as NEP in VBN); *perceived behavioural control,* which refers to the perceived ease or difficulty in performing the behaviour (same as personal efficacy), and subjective norms (See Figure 2, Ajzen, 1991). There are two key differences between the TPB and the VBN: the TPB does not include personal values,

and norms are defined differently in the two theories. In the VBN model, norms are defined as perceived personal obligation to act, whereas in the TPB, norms are defined as subjective (also referred to as *injunctive* or *social* norms), which reflects the perceived social pressure to act. This distinction makes norms a social as opposed to an individual-level construct.
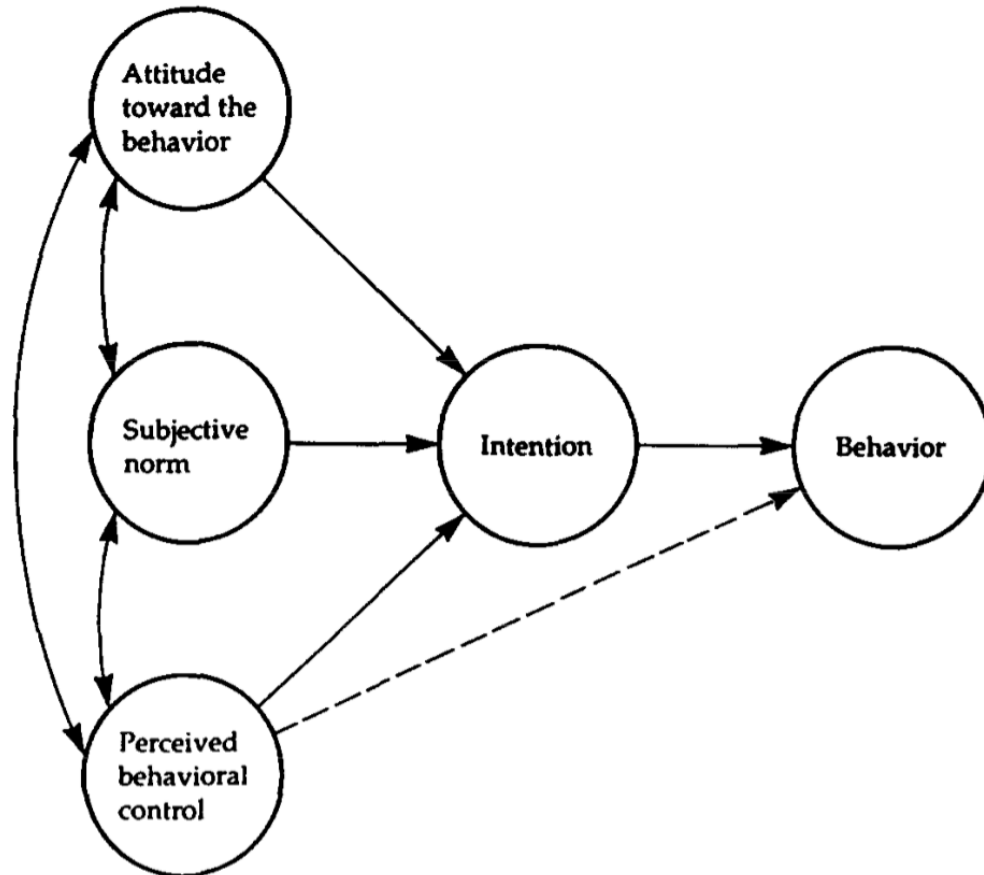
Figure 2. Theory of planned behaviour (Ajzen, 1991, p. 182)

A meta-analysis of 66 studies in 28 countries examining the TPB and pro-environmental behaviour found that the theory successfully predicts intentions and behaviours in individualist countries, and only intentions in collectivist countries; however attitudes and behavioural control were not consistently related to intentions (Morren & Grinstein, 2016). Harland, Staats, and Wilke (1999) found that the TPB was

correlated to past behaviours of using unbleached paper, sustainable transportation, switching to energy saving light bulbs, and turning off the faucet. However, the effect sizes for some behaviours were as low as 1%, which is likely due to contextual constraints on behaviour such as poor infrastructure. They also found that the addition of personal obligation from the VBN theory increased the explanatory power over and above the TPB by up to 10%. Similarly, Poškus (2016) found that perceived behavioural control (TPB) and personal obligation (VBN) consistently predicted intentions to recycle, to use sustainable transportation, and to conserve water and electricity in a Lithuanian sample. Attitudes, values, and descriptive norms did not influence these intentions, however.

Combining theories of individual pro-environmental behaviour and other predictive factors. Studies routinely find that a number of factors from multiple theories are needed in order to account for pro-environmental behaviour. For example, Ahmad, Bazmi, Bhutto, Shahzadi, and Bukhari (2016) found that in addition to social norms, attitudes, and behavioural control, behavioural intention was significantly influenced by factors such as problem awareness, knowledge about environmental issues, previous experience, and time commitment. Liebe, Preisendöfer, and Meyerhoff (2011) compared the explanatory power of attitudes, the TPB, and NAM in predicting people's willingness to pay for public environmental goods such as national parks in a sample of German participants. They found that when tested separately, attitudes accounted for 9% of variance in willingness to pay, the TPB accounted for 32%, and NAM accounted for the most variance, at 41%. When all models were tested together, personal obligation, personal responsibility, and the use of public goods (whether the participants actually

went to national parks) predicted the majority of the variance in the willingness to pay.

Cordano, Welcomer, Scherer, Pradenas, and Parada (2011) compared students' pro-

environmental intentions using the NAM, VBN, and TPB theories in Chile and the

United States. In both samples each of the three models explained a significant amount

of variance (R^2 between .49 and .58) although in the Chilean sample only traditional

values predicted behavioural intention, whereas in the US sample only self-transcendence

values had predictive power.

Although there appears to be some variation, the literature is beginning to

converge on a set of relevant factors that motivate pro-environmental behaviour.

Bamberg and Möser (2007) conducted *SEM* meta-analysis (*MASEM*) on the psychosocial

determinants of pro-environmental behaviour based on 46 studies conducted between

1995 and 2006. Their results found mean correlations of r = .42 between attitude and

pro-environmental behaviour, r = .30 between perceived efficacy and behaviour, and r =

.39 between perceived obligation (which they referred to as moral norm) and behaviour.

They found that behavioural intentions explained 27% of variance of actual behaviours,

which is typical in the TPB literature. Their integrated model included values, attitudes,

moral and social norms, and explained 52% of variance of pro-environmental intentions

and 27% of pro-environmental behaviour (see Figure 3).
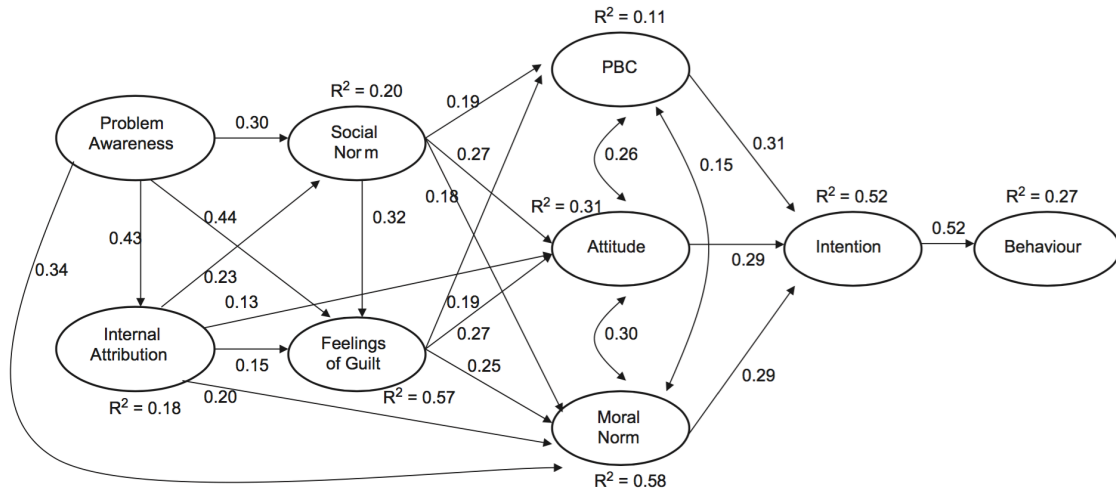
Figure 3. *MASEM* results from studies on psychosocial determinants of pro-environmental behaviour (Bamberg & Möser, 2007, p.16).

In summary, the research on individual pro-environmental intentions and behaviour suggests that no single extant model comprehensively accounts for behaviour. Individuals appear to be influenced by a combination of individual values, a sense of personal obligation and efficacy, as well as what others around them profess to be important and how they actually behave. Further, how these factors influence behaviour also appears to be culturally bound.

Building on individual-level models of pro-environmental behaviour. In an effort to build a parsimonious theory of pro-environmental behaviour some inconsistencies in conceptualization need to be resolved. In the VBN theory norms are defined as personal/moral (personal obligation) and are activated by individual values and beliefs. Although studies consistently show that these personal norms are the strongest predictor of pro-environmental intention, it could be argued that this construct overlaps with beliefs, which is the perception that something is true (and therefore one's perceived obligation is the belief that one must take action). The VBN/NAM theories

also suggest that morals come from individual values. However, one's perception of what is moral is deeply influenced by whether other people in one's group or culture consider it a moral issue, thus morals can be thought of as conventional and therefore external to the individual (Jensen, 2011; Pagliaro, Ellemers, & Baretto, 2011). People may get their sense of morality, or moral norms, from social obligation to others (Miller & Bersoff, 1992; 1994), or may feel embarrassed, ashamed, or afraid of social sanctions if they do something considered immoral by the group (Kaiser, Schultz, Berenguer, Corral-Verdugo, & Tankha, 2008). Likewise, contrary to the VBN definition of norms as personal beliefs, the TPB defines norms as perceived social pressure to perform the behaviour. Although these norms (referred to as *injunctive* from here on) still measure the individual's perception, they are based on the expectations of important others, and are therefore also social as opposed to personal.

In addition to injunctive norms, both theories omit *descriptive norms*, defined as observed behaviours performed by others (Cialdini, Reno, & Kallgren, 1990). The influence of injunctive and descriptive norms (together referred to as *social norms*) on pro-environmental behaviour is a separate and vibrant area of research that is not consistently integrated into TPB and VBN theories. For example, Schultz, Khazian, and Zaleski (2008) found that hotel guests could be persuaded to reuse towels when messages in the hotel room express both an injunctive ("Our guests approve of conserving energy") and descriptive norms ("75% of hotel guests reuse their towels"). A neighbourhood experiment on curbside recycling found that telling households how much their neighbours are recycling (descriptive norm) was the most effective out of five types of interventions (Schultz, 1998). However, further research found that descriptive norms

can be a double-edged sword: if households who receive such an intervention found out

that neighbours used more energy than them, they were more likely to *increase* their

consumption to be closer to the norm (Schultz, Nolan, Cialdini, Goldstein, &

Griskevicius, 2007).

There is consistent evidence that injunctive and descriptive norms must be

aligned. A study by Grønhøj and Thøgersen (2012) found that regardless of the attitude

toward environmentalism, adolescents' likelihood of purchasing eco-friendly products,

recycling, and conserving electricity, depended on what they observed their parents do

(descriptive norms). Furthermore, the authors suggested that descriptive norms had a

stronger influence on behaviour than contradictory injunctive norms. That is, youth infer

values of whether environmentalism is important from observing parental behaviour. If

parents said that environment was important to them but did not follow through with

behaviour to match, teens followed the behaviour and not the articulated values. Oceja

and Berenguer (2009) illustrated the powerful effect of descriptive norms by conducting

an experiment in public bathrooms. Their experiment showed that individuals are likely

to unconsciously follow what others do. For example, if patrons walk into a public

washroom where the lights are on, they will leave them on, even if there is a sign asking

them to turn the lights off in order to conserve energy. When injunctive and descriptive

norms are in contradiction, it appears that most individuals follow the descriptive norm.

This suggests that whether people are cognizant of the influence that others have on their

behaviour, it is important for a model of pro-environmental behaviour to account for both

types of social norms.

In summary, the present study defined and measured personal norms and social norms as two distinct constructs: Personal norms were measured in line with other studies in the literature as perceived personal obligation to act but were grouped with beliefs, and social norms were conceptualized as external to the individual and included moral, injunctive, and descriptive norms.

Limitations of individual-level approach to pro-environmental behaviour. Finally, the fundamental assumption that individual behaviour change is the answer to environmental problems warrants a closer examination. Webb (2012) suggests that government initiatives support and focus on individual behaviour change because they do not threaten the status quo in a meaningful way. These strategies are ultimately self-defeating because they promote individual behaviour change without addressing the context of growth and consumption that is fundamentally incompatible with solving the problem of climate change (Cherrier, 2012; Grant, 2011; Klein, 2014; Thøgersen, 2014; Webb, 2012). Only a minority of individuals would have the capacity to make significant change to their behaviour, and rather than influencing others, they are more likely to isolate themselves (Clark, 1995) and face significant barriers to maintaining behaviour performance.

For example, Isenhour (2010) provided a case study that illustrated how the focus on individual sustainable consumption practices is not effective even in countries that consider themselves leaders in sustainability, such as Sweden. Isenhour interviewed representatives of various government, NGO, and research organizations, and conducted focus groups and interviews with residents. She found that even though Sweden invests in sustainability research, legislation, and planning, it is still a capitalist culture that has a

highly competitive, export-oriented economy with a strong and highly conformist consumer culture. Although over 60% of participants in this study claimed to be reducing their environmental impact, participants acknowledged that social pressure of consumption was difficult to avoid, as having nice things was a key marker of social status and eschewing which resulted in having to sacrifice social memberships. Thus many participants found themselves inconsistent in their sustainability efforts, playing a kind of moral calculus and as a result, making little impact in reducing their carbon footprint (Isenhour, 2010).

The majority of these participants recognized that being conscious consumers is not enough and acknowledged the need to become active citizens in collectively dismantling social hierarchies that perpetuate consumption in order for meaningful change to occur. This example illustrates the limitations of theories like VNB and the TPB, as individuals who may endorse environmental values and beliefs may do nothing because they perceive their individual behaviour as having little impact. In order to exit this recursive loop of inaction, individuals must seek cooperation with others. However, none of the individually based theories of pro-environmental behaviour account well for collective behaviours.

Collective Environmental Action

Climate change is often conceptualized as a case of the commons dilemma (e.g., Blamey, 1998; Gifford & Hine, 1997; Hardin, 1968) in the social science literature. The commons dilemma refers to Hardin's (1968) *Tragedy of the Commons* paper that discusses the issue of common property resource management. The structure of the dilemma is as follows: There are resources that everyone has to share and no one has control over (the commons). In these situations it is best for everyone in the long run if each individual conserves the amount of common resources that they use so that the commons are not depleted. However, in the short term, it benefits each individual much more to use as much of the resources as possible. Thus the tragedy of the commons, according to Hardin, is that any "rational" person would act to benefit themselves in the short term, rather than act for the benefit the collective in the long-term (Dawes, 1980; Hardin, 1968). Economic theories routinely use laboratory studies to show that most individuals are "rational" and apply this logic to environmental problems, which makes the problem of climate change intractable.

However, this notion of rationality is distinct from how people actually behave. Studies show that different types of groups are able to cooperate to manage natural resources without depletion, suggesting that people do not always act rationally as the commons dilemma and economic theory in general tend to predict (Feeny, Berkes, McCay, & Acheson, 1990; Ostrom, Walker, & Gardner, 1992). Studies also show that people behave cooperatively (or irrationally) for a variety of reasons including cultural and moral norms (Bettenhausen, & Murnighan, 1991; Biel & Thøgersen, 2007; Boyd & Richerson, 1982; Pagliaro, Ellemers, & Barreto, 2011; Pillutla & Chen, 1999), feelings of

empathy (Brosig, 2002; Lanzetta, & Englis, 1989; Rimé, 2007), whether they endorse independent or interdependent self-construals (Chen, Wasti & Triandis, 2007; Marcus & Le, 2013; Utz, 2004), and social identity (Berkman, Lukinova, Menshikov, & Myagkov, 2015; van Dijk, de Kwaadsteniet, & De Cremer, 2009).

Blamey (1998) explains that because the commons are non-excludable (everyone can use them but not everyone has to contribute), freeriding is unavoidable, but enough people have to conserve so that the commons do not get depleted. In other words, individuals have shared responsibility with others but lack decisive influence; a single person's contribution may have little consequence unless a certain threshold of participation is reached. Consequently, environmental action requires either cooperation or coercion and is therefore an inherently collective problem that requires a collective action response. Collective action cannot be taken by an individual in isolation and thus has to be based on perceived willingness of others to coordinate (Ostrom, 1999). Collective action involves groups of individuals with common interests who act on behalf of their common interests and as a "countervailing power" to powerful institutions like the government (Olson, 2002).

Social identity model of collective action. One framework that has emerged in social psychology to explain and predict the capacity for collective action is the social identity model of collective action (SIMCA). According to this model, people are motivated to participate in collective action because of social identity, emotional motivation, collective efficacy, and moral conviction (Van Zomeren, 2013). *Social identity* refers to identification with a group via a socially shared understanding, or what is consensually held as social reality in a group (Van Zomeren, Postmes, & Spears,

2008). *Emotional motivation* comes from perceived injustice, which develops on the basis of social comparison to others and causes group-based emotions like anger and guilt (Van Zomeren, 2013). *Collective efficacy* is a shared belief that collective action will be effective in achieving the group's goal. People who are high on collective efficacy are found to be more involved in community activities and are more likely to support government climate change adaptation policies and implement such policies in their communities (Thaker, 2012). A more recent version of the model includes, *moral conviction,* which is an absolute stance that something is right or wrong (Van Zomeren, Postmes, & Spears, 2012) that motivates the individual's identity to become politicized.

Rees and Bamberg (2014) applied the original version of the SIMCA model (from Van Zomeren, Postmes, & Spears, 2008, which did not include moral convictions) to examine collective pro-environmental behaviour. Further, they integrated social norms into the SIMCA model because they argued that collective action is socially embedded, and thus likely influenced by the behaviour and expectations of important others. Rees and Bamberg defined social norms as the perceived social pressure from important others to participate in collective action (or injunctive norms, as discussed earlier). Added to the SIMCA model as a predictor, social norms emerged as the strongest predictor of intention to participate in collective action (See Figure 4) and the full model explained 63% of variance.
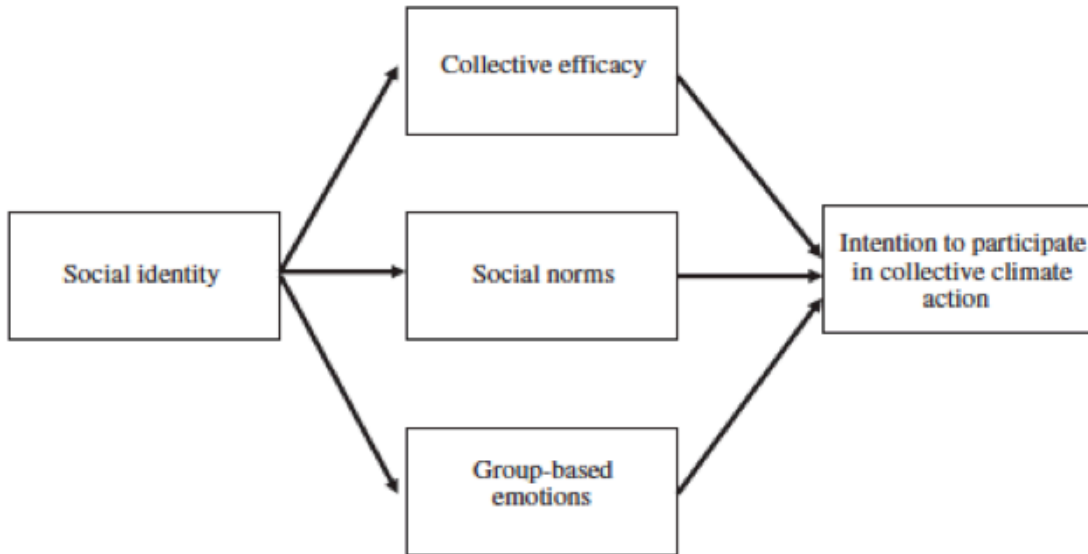
Figure 4. Social identity model of collective action (Rees & Bamberg, 2014, p. 469)

Furthermore, Bamberg Rees, and Seebauer (2015) tested various alternative

models that combine the SIMCA and the TPB, and found that the additional predictors of

personal efficacy, attitudes, and social norms were statistically significant and increased

the predictive power of the overall model (R^2 = .83). However, the limitation of this

model was that individuals had to identify as part of a specific group, with the outcome

measuring intention to participate in group activities, with the strongest predictor being

group identity. Recent research suggests that many individuals participate in collective

action on an ad-hoc basis, especially for events that are organized over social media

(Flanagin, Stohl, & Bimber, 2006). That is to say, group membership in these cases is

fluid and diffuse; individuals may have no connection or allegiance to a specific group,

but come together temporarily for a common purpose in a common place.

Combining multiple models of pro-environmental behaviour. Bamberg and

colleagues recommended that future research in collective action and pro-environmental

behaviour should focus simultaneously on individual and group predictors. Thus, further

integration of SIMCA into the literature on environmental behaviour would provide a

more complete understanding of how and when individuals opt to engage in individual

and collective behaviours, which are likely part of an integrated repertoire of action.

Although group change is required in order to reduce collective emissions, the agency of

change rests on individual level processes. Motivation for collective action may arise in

part out of frustration with the ineffectiveness of individual action (Isenhour, 2010).

When individuals feel as though their behaviour is ineffective, they may seek

participation in collective action in order to help "unfreeze" the existing status quo

(Kwantes & Koustova, 2014). However, because that level of engagement requires a lot

of time and energy, individuals likely go between periods of collective involvement and

periods of retreat from collective participation and focus on individual behaviour.

Individuals who engage in individual-level pro-environmental behaviour provide a pool

of potential recruits for collective action (Stern, 2000).

The variables included in SIMCA also seem to lend themselves to being

incorporated into the VBN/TPB models of environmental action. Refer to Figure 5 for a

relabeled conceptual model of SIMCA.
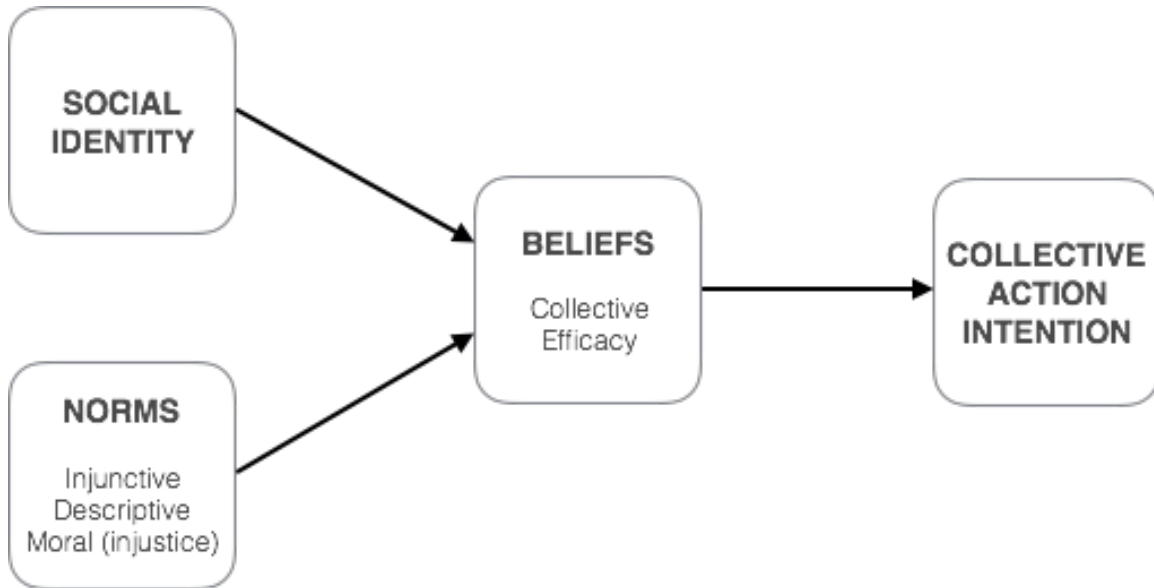
Figure 5. SIMCA remodeled using VBN and TPB frameworks

        Social identity is related to the concept of values from the VBN model in that

both could be said to address aspects of the individual's self-concept. Whereas values are

the individual criteria for what is considered desirable, social identity theory argues that

the social group one belongs to influences the values one espouses (Turner, Oakes,

Haslam, & McGarty, 1994). Unfortunately, because each individual may have many

different social identities, this model is limited in its general predictive power, as

identification with a particular group must be measured. To circumvent this problem,

Rees and Bamberg (2014) measured social identity as perceived sense of community

which defines the individual's social identity through perception of similarity to others,

and acknowledgement and maintenance of interdependence with others (Rees &

Bamberg, 2014). Social identity is thus a psychological bridge between the individual

and the group in is reflected in the individual's values. Social identity, in conjunction

with social norms, influences an individual's beliefs regarding collective efficacy. These

efficacy beliefs mediate the effect of social identity and norms on behavioural intention to participate in collective pro-environmental behaviour. Although the original SIMCA model includes both emotions/perceived injustice (guilt and anger) as well as a separate construct of morality, the case has been made earlier in this paper that emotions such as embarrassment, shame, and fear of social sanctions are a reflection of moral norms (Kaiser, et al., 2008).

In addition to exploring predictors of individual and collective pro-environmental behaviour, it is imperative to consider the effect of cultural cognition. Social identity as perceived sense of community varies depending on cultural contexts. Some cultural and situational contexts tend to favour the definition of the individual as separate and unique (i.e., individualism) while others place more emphasis on having a sense of community (i.e., collectivism). For example, qualitative evidence suggests that people in individualist contexts are less likely to consider how to reduce aggregate consumption because they do not conceptualize the problem of climate change as a collective action problem (Laidley, 2013) and therefore do not utilize collective action strategies (Markle, 2014). The cultural repertoire available to address environmental issues may be limited to individual consumer actions such as recycling and green consumerism, which become symbolic for taking action on climate change (Markle, 2014). A cultural cognition approach can help address the limitations of the theories of pro-environmental behaviour by examining the fundamental worldviews that affect beliefs and behaviours.

Culture and Pro-Environmental Behaviour

Capitalist economic systems, which can be observed in nations such as Great Britain, Australia, Canada, New Zealand, the United States, Germany, the Netherlands,

and Switzerland, are based on Adam Smith's inherently individualist idea that the pursuit

of self-interest of the individual leads to maximum wealth for the nations. Some scholars

consider these types of systems as the root of environmental problems (Feygina, 2013).

Others argue that rather than capitalism per se, the international economic system that

includes both capitalist and socialist nations, puts human desires above the environment,

and is therefore susceptible to environmental abuse (Axelrod & Suedfeld, 1995).

Regardless of which economic system is to blame, the premise that human needs take

precedent above all others is deeply entrenched in the Euro-American worldview.

According to Clark (1995), this worldview is based on three major assumptions: 1) that

human nature is greedy, competitive, and aggressive, 2) that resources are scarce, and 3)

that progress is cumulative. Within this social/cultural framework, self-interest,

competition, and profit-maximization have become the central values considered rational

and good for society (Alexander, 2007; Kasser, Cohn, Kanner, & Ryan, 2007; Webb,

2012) and produce a "psychological stance of domination, superiority, and separation

from nature" (Feygina, 2013, p. 368). These values map onto cultural constructs of

individualism-collectivism and *power distance*. The present paper explores how they fit

within a model of pro-environmental behaviour.

   Individualism-collectivism. According to Triandis (1995) there are four

different attributes on which individualist and collectivist cultures differ:

1. Definitions of self as either independent or interdependent

2. Personal and communal goals are aligned in collectivism and not related in
    individualism

3. Collective cognitions focus on norms, obligations and duties; individualist cognitions on attitudes, individual rights, needs, and interpersonal contracts

4. In individualist societies relationship ties are loose, with individuals looking after themselves and their immediate family, as opposed to collectivist societies where people are integrated into cohesive ingroups that take care of individuals for life and expect lifelong loyalty in return (Hofstede, 1991; Oyserman, Coon, & Kemmelmeier, 2002; Triandis 1995).

Evidence for the influence of individualism and collectivism on pro-environmental behaviour is mixed. Sociological accounts paint a bleak picture: in the American version of capitalism, corporations and governments are found to be in bureaucratic symbiosis designing social policy to reflect their increasing individualism and disproportionate social power (Kasser et al., 2007). And the United States is not alone, "The global economy is making vertical individualism more respectable than it was. Dog-eat-dog competition is now seen as inevitable, and the neglect of those who cannot compete is seen as the price that must be paid for the success of those who can compete" (Triandis, 1995, p.174). This cultural shift toward individualism in industrialized countries is supported by evidence from cross-cultural research (Hofstede, 1991; House et al., 2004; Oyserman, et al., 2002; Triandis, 1995).

Individualist cultures promote a narrative of personal responsibility in line with central values of individualism, placing the burden on the individual consumer for slowing climate change. The responsible consumer narrative is simultaneously undermined through promotion of contradicting cultural values of attaining social status through consumption, which ties individualism and power distance together. Kasser and

team (2007) assert that the psychological reality of individuals set up to compete against one another for material gain leads people to become less concerned about broader community, have poorer interpersonal and intimate relationships, and feel that they have little choice in whether to pursue material goals. The pursuit of wealth perpetuates the money-rich-but-time-poor lifestyle that depends on single-use convenience items and unsustainable modes of transportation (Cohen, Higham, & Cavaliere, 2011; Higham, Cohen, & Cavaliere, 2014). Individuals are encouraged to not be a burden on society, which leads to desire to accumulate property, insurance, and retirement savings. The welfare system, meant to be a safety net for those who cannot fend for themselves instead has a polarizing effect, producing a "subclass of dependent and alienated citizens" (Clark, 1995, p.74) who are often perceived as lazy and deserving of their fate.

Psychological studies that have examined American and individualist attitudes about climate change are somewhat conflicting. Accumulating evidence suggests that people in individualist societies are more likely to engage in environmental behaviours for egotistic reasons, such as when environmental degradation affects their personal health, or an environmental policy or product will save them money (Patchen, 2010). They are also unlikely to support policy that would be personally costly, and are more likely to think governments and businesses, as opposed to individuals, should be held responsible for addressing environmental problems (Patchen, 2010). Overall, Price, Walker, and Boschetti (2014) found that people in individualist cultures were more likely frame the environment as elastic – something that is both uncontrollable and resilient. A study by Jang (2013) found that when exposed to information about their own group's excessive energy consumption, Americans attributed climate change to uncontrollable

causes. However, when exposed to information about China's excessive energy use, they were more likely to attribute the cause of climate change to humans, and were more likely to express concern about climate change and show support for climate change policy. Many Americans do see climate change as a moral issue (Gifford & Nilsson, 2014) and show evidence of collective guilt (Glasson, Frykholm, Mhango, & Phiri, 2006), which manifests itself via efforts to export wilderness preservation training to the developing nations like India (Serenari, Bosak, & Attarian, 2013) and Malawi (Glasson, et al., 2006). These training efforts aims to teach people of those cultures how to take care of their land, even though the environmental degradation was in many cases caused by corporate industrial and agricultural activity.

Other cross-cultural comparative studies, however, seem to suggest that individualism is linked to increased pro-environmental attitudes and behaviours. Caprar and Neville (2012) reviewed a number of studies that examine the relationship between cultural dimensions and sustainability and found six studies that showed a positive correlation with high individualism, two studies that showed a positive correlation with low individualism, and two with high collectivism. Soyez (2012) also found that countries with individualistic national values had a more ecocentric orientation, though her comparison group of collectivist countries comprised of just Russia. These studies appear to be in line with research on social capital, which suggest that individualism actually provides the necessary conditions for cooperation and social solidarity by emphasizing the freedom to choose one's own goals and being independent (Realo & Allik, 2009).

In addition, there is some evidence to suggest that individualism and collectivism may also affect the influence of norms on pro-environmental behaviour. Blanton and Christie (2003) suggest that individualists want to "stick out" in a positive way because they are encouraged to develop an identity that is unique and consistent across situations (Markus & Kitayama, 1991) and because individualist cultures are more tolerant of dissenting ideas (Hornsey, Jetten, McAuliffe, & Hogg, 2006; Jetten & Hornsey, 2014; Ng & van Dyne, 2001). The implication is that individualists who endorse pro-environmental values are more likely to act in environmentally friendly ways regardless of the behaviour of others, and are more likely to have their deviant behaviour perceived as a positive exercise of their freedom and distinctiveness. For example, Cialdini, Wosinska, Barrett, Butner, and Gornik-Durose (1999) found that for individualists, information about their own previous behaviour had more impact on subsequent behaviour, whereas for collectivists social norms had more impact.

Other studies however, suggest that social norms are important in individualist cultures such as the U.S. as well. Ando, Ohnuma, and Chang (2007) compared the influence of norms in U.S. and Japan on three types of pro-environmental behaviour: resource conservation, energy conservation, and re-use. Their findings suggest that injunctive norms had positive but limited effect on Japanese participants, while descriptive norms were a powerful determinant of pro-environmental behaviours in the U.S. sample. The authors suggest that U.S. participants had more exposure to people who were environmentalists as a function of their bigger, looser networks (Granovetter, 1973) and though they *felt* less social pressure than the Japanese participants, the effect was greater on behaviour. In line with these findings, experimental studies show that the

influence of descriptive norms on behaviour is robust despite the fact that participants self report that they are not influenced by norms (Cialdini, 2007; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). These scholars suggest that this is in part a problem of self-report methodology, as people tend to underestimate how much the behaviour and opinions of others impacts their own (and tend to attribute it to their own choices).

The main limitation of these studies on individualism and collectivism is that they measure culture at the group level assuming that individuals endorse those values at the individual level (Fischer, 2009). Compounding the problem, outcomes are sometimes measured at the individual level, while cultural values are assumed based on nation. In order to unpack some of the effects of cultural constructs on behaviour, the present study focused on one of the four attributes of individualism and collectivism – the psychological definition of self via independent and interdependent self-construals. There is one advantage to measuring individual-level individualism and collectivism: although at the group level, the two constructs appear to be on a continuum, at the individual level a person can develop a self-definition that encompasses both, and it can be argued that the balance of both independent and interdependent self-construals is what is needed in order to build a healthy society that focuses on both the welfare of individuals and groups (Triandis, 1995).

Self-construals and individual pro-environmental behaviour. *Independent* and *interdependent self-construals* are two of the many different ways in which individuals can define the self. Cultural context promotes the elaboration and accessibility of a dominant self-construal through its social structures, emphasis on individual vs.

collective goals, and methods of socialization (Cross, Hardin, & Gercek-Swing, 2011).

According to Markus and Kitayama (1991), in individualist cultures it is a cultural

imperative to develop an independent self-construal. Parents teach their children to be

independent by encouraging them to be unique, achievement oriented, speak their mind,

make their own decisions, and pursue their personal goals. One's behaviour is organized

and motivated by one's own repertoire of thoughts and feelings and leads one on a quest

for self-actualization. Others are used as a source to verify one's thoughts and feelings

about themselves, and social actions are strategic for self-expression and individual goal

attainment. In collectivist cultures, on the other hand, there is an emphasis on the

interdependent self-construal, or one's fundamental connectedness to others within a

network of social relationships, where the primary motivations are to fit in with others

and fulfill one's duty as a member of the group (Oyserman et al., 2002). Parents teach

their children to show duty to the family, to maintain harmony, and to hide anger.

Control and regulation of one's own thoughts, feelings, and actions to keep them

secondary to group needs is considered the hallmark of maturity (Markus & Kitayama,

1991). The two dimensions of self-construal are orthogonal, meaning every individual

has elements of both construals that are independent of one another (i.e., being high on

one dimension does not imply being low on the other).

　　　　Together, the two self-construals form the multifaceted definition of self that

allows for self-categorization (Turner et al., 1994), however people in different cultures

sample these different self-construals in different proportions (Triandis, 1989) – in

individualist cultures people are more likely to endorse the independent self-construal,

and in collectivist cultures people are more likely to endorse the interdependent self-

construal. Self-construals are also thought to be dynamic, where based on the

individual's accessibility and situational applicability, individuals are able to switch

between independent and interdependent self-construals, changing how they interpret and

react to situations (Hong & Mallorie, 2004; Koustova, 2011; Oyserman, 2011; Turner et

al., 1994). In the present study, it is proposed that individuals who endorse both

independent and interdependent self-construals are more likely to act pro-

environmentally, because they would be concerned about both self and others, and would

be most flexible in either going against social norms if they conflict with their

environmental beliefs, or follow social norms if they align with those beliefs.

Only two studies could be located that examined independent and interdependent

self-construals and their effect on individual environmental behaviour. Mancha and

Yoder (2015) examined environmental behaviour using self-construal theory and TPB.

Their model had good fit and explained 53% of variance for behavioural intention. Both

independent and interdependent self-construals were found to positively relate to

environmental attitudes and behaviour intentions, and these relationships were moderated

by injunctive norms. However, in her dissertation using a sample of Americans, Iwaki

(2011) found that in the presence of other variables (trust, self-efficacy, perceived risk,

worry, knowledge, and cultural worldviews), self-construals did not predict behavioural

intention or policy preferences. These studies, although limited, suggest that rather than

directly impacting behaviour, self-construals likely have an indirect influence in

conjunction with beliefs and social norms.

Other researchers argue that independent and interdependent self-construals do

not adequately address the full of range of how individuals can construe themselves in

relation to others. Specifically, interdependent self-construal only focuses on the self in relation to one's ingroup, whereas large-scale problems such as climate change require one to think of the self in relation to humanity or the world. DeCicco and Stroink (2007) propose the *metapersonal self-construal*, which is based on Buddhist beliefs, and is defined as the deep interconnection with all forms of life. Metapersonal self-construal was postulated to describe individuals with transcendent self that see themselves as connected to all things and behave in a manner that is considerate of all things (DeCicco & Stroink, 2007). A similar construct comes from eco-psychology and concerns the role of the natural world in one's self-concept. A review by Passmore and Howell (2014) of eco-existentialism argues that from a young age humans identify with nature and other animals and understand the self "within a context of mixed species community" (p.373) with animals and trees being prominent in our collective psyche and cultural myths. The metapersonal self-construal differs from the interdependent self-construal because it includes not only significant others from one's ingroup, but all living things. Individuals who construe themselves in a metapersonal way understand the separation of self as an illusion and consider all living things as part of a whole. Stroink and DeCicco (2011) proposed that metapersonal self-construal is orthogonal to the other two self-construals and is related to universalism values.

Arnocky, Stroink, and DeCicco (2007) tested the three-construal model and its relationship to different types of environmental concern in a group of Canadian undergraduates. They found that independent self-construal predicted conservation behaviour based on egocentric environmental concern (concern about the environment when it impacts the individual), and led to competitiveness in resource sharing.

Interdependent self-construal predicted resource cooperation but not environmental concern. Metapersonal self-construal predicted cooperation in resource sharing, and conservation behaviours based on biospheric environmental concern, which focuses on the inherent value of the environment.

Self-construals and collective pro-environmental behaviour. The self-construal research discussed so far focuses only on individual pro-environmental behaviours. To date, only one theoretical article directly addresses the question of self-construal and collective behaviour. According to Oyserman and Lauffer (2002) social movements gain membership by providing a collective focus. They argue that since individuals have both independent and interdependent self-construals available to them, a movement can appeal to participants by emphasizing group needs which will make the interdependent self-construal salient, but that this may be difficult in individualist settings as groups are seen negatively because they bind personal freedoms. Oyserman and Lauffer further suggest that in individualist cultures, people's independent self-construal is likely to be stable, while interdependent self-construal is variable depending on the situation. This suggests that rather than studying which self-construal is responsible for pro-environmental attitudes or beliefs, it may be useful to focus on the balance between self-construals as both appear to have both positive and negative influence on pro-environmental behaviour. As Triandis (1995) concludes, "The optimal states of individual and societal health are linked to the balance between [individualist and collectivist] tendencies" (p.2).

How individuals construe themselves in relation to others is also intimately tied with power relations between individuals. As discussed earlier, Triandis was particularly critical of vertical individualism, which promotes both individual interests and stratified

social hierarchy. The following section explores this concept of power distance between individuals and how it relates to pro-environmental behaviour.

Power distance. Power distance is defined as "the degree to which members of a collective expect power to be distributed equally" (House et al., 2004, p.513) or the degree to which people are willing to accept inequality as unavoidable or legitimate (Hofstede, 1991). Most cultures are found to be relatively high on power-distance with a noticeable disparity between values and practices: People prefer a more equal society but in reality live in a more stratified power structure (House, et al., 2004). This is because a culture's power distance is defined by the equilibrium between the powerful seeking more power and the less powerful seeking to reduce inequality (Hofstede, 1991). According to Triandis (1995), high power distance in collectivist cultures and low power distance in individualist cultures is typical, though other combinations are possible. It could be argued that the increase in income inequality in many individualist countries is indicative of increase in power distance.

Power distance in a culture influences "levels of participative decision making, centralization and formal hierarchy… individuals with power are seen as superior, inaccessible, and paternalistic… those with less power are generally submissive, loyal, and obedient" (Daniels & Greguras, 2014, p. 1204). At the macro level, power distance has been linked with lack of social progress, focus on status-quo maintenance, and low accountability (Daniels & Greguras, 2014). High power distance societies are more likely to accept injustice, be more corrupt, and perceive corporate responsibility for the environment and employee welfare as antithetical to economic growth (Daniels & Greguras, 2014). Power distance manifests itself in several different ways, including

anthropocentric vs. biocentric views of nature, economic inequality, and social dominance orientation.

　　Anthropocentric and biocentric views of nature. Power distance is rooted in people's conception of the hierarchy of living things. Cultures high on power distance tend to endorse the *anthropocentric view* of nature (Milfont, Ritcher, Sibley, Wilson, & Fischer, 2013) via cultural narratives, norms, and institutions. As a group, people who hold this view believe that humans are closest to the gods in the hierarchy of nature and intellectually superior to other animals (Feygina, 2013; Glasson et al., 2006; Serenari et al., 2013) and tend to separate from, dominate, and exploit the environment (Feygina, 2013) because it is understood that nature is created for the benefit of humankind. Humans, as stewards and owners of nature, have a duty to use it to its full potential, or what Milfont and colleagues (2013) refer to as the "legitimizing myth" that allows for exploitation such as overusing land without allowing for regeneration, growing things in inhospitable environments using labour-intensive methods, diverting rivers, building dams, clear-cutting forests, and otherwise trying to control nature. This way of relating to nature also carries over into intergroup relationships. For example, European settlers in the Americas considered Indigenous peoples as part of the natural environment (i.e., animals), and "cleared [them] away" with the environment, thus "embedding violation of human rights into the modern conception of nature" (Feygina, 2013, p.367).

　　The same legitimizing myth that allowed for justification of imperial colonialism now manifests itself as *carbon colonialism* as evident under cap-and-trade schemes. A cap-and-trade scheme is currently considered to be the forefront solution to reducing carbon emissions in many nations and already exists in Europe, Australia, the USA

(California), Canada (Alberta, Ontario, and Quebec), and is being considered in China, Brazil, Mexico, and other parts of Canada such as British Columbia (Ontario Ministry of Environment and Climate Change, 2015). A *cap* is a limit put on the amount of emissions that companies are allowed to produce in a given year and is meant to be reduced year after year. *Trade* is meant to incentivize companies to innovate: If they emit less carbon than what they are allowed to release into the atmosphere, they can sell the rest of their allowances (known as carbon units) to other companies who are having a harder time meeting their targets (Environmental Defense Fund, 2015). Companies can also acquire allowances/carbon units from helping third-world countries become greener, even though those countries are not obligated to lower their emissions under the Kyoto Protocol (Carbon Control, 2012) nor the 2015 Paris agreement (Center for Climate and Energy Solutions, 2015). Allowances let companies offset their emissions, however they also provide loopholes that have already led to egregious instances of cheating (Bachram, 2004).

For example, a company bought a forest in Indonesia that was populated by Indigenous people. The original forest was burned, and replaced by palm oil trees; the company then received offset permits for planting trees in an "ecologically devastated" area. They were then able to sell their offset permits for profit to other companies while also making money from their palm oil plantation (Leonard, Sachs, & Fox, 2009). Cap-and-trade, as implemented, allows for this kind of abuse due to weak government regulations in developing countries and loophole provisions written into the schemes by industry lobbyists who assist politicians in writing policies (Bachram, 2004; Klein, 2014). The Indigenous peoples who are uprooted in situations like this are often relocated to an

impoverished natural environment where they are unable to resume their way of life, creating displacement and poverty.

Indigenous peoples are more likely to endorse a *biocentric view of nature* in which humans are within the natural whole instead of presiding over it (e.g., Fowler, 2012; Glasson et al., 2006; Serenari et al., 2013). Many environmentalists and academics work together with Indigenous peoples to urge governments to learn from their relationship with nature. However, it is not always the case that Indigenous cultures take the biocentric approach. For example, Atran, Medin, and Ross (2005) studied three different Meso American Indigenous groups who showed varying levels of environmental stewardship. Their study found that the distinguishing feature between the culture that showed the greatest environmental concern and ones that did not was their deeper understanding of the interconnectedness and reciprocity between plants, animals, and humans, which potentially implies metapersonal self-construal.

Income inequality. Another way that power distance manifests in society is income inequality. Large power distance allows for increasing income inequality through unfair distribution of resources. In addition, research suggests that countries that have large class/income inequality have large between-class differences in individualism-collectivism: The poor tend to be more collectivist and the affluent are increasingly individualistic, typically emphasizing pleasure through consumption of goods (House et al., 2004; Vandello & Cohen, 1999). Socio-economic growth allows for the maintenance of status quo between the classes because it gives the low-socioeconomic group the perception that they have a chance to "get a piece of the pie via the creation of a larger pie, rather than via the redistribution of shares of the existing pie" (Kasser et al., 2007, p.

5). In addition, perception of social mobility, or that one can climb the social ladder into a different social economic bracket reduces the sense of unfairness that would otherwise lead to perceived injustice and the development of social identity that could propel collective action. People work their whole lives with the belief that hard work leads to economic success, which with it presupposes that the system rewards justly.

Socio-economic status also affects how groups perceive climate change and what they are willing to do about it. Many of the individual-level behavioural solutions promoted by individualist cultures to help people decrease their consumption rely on the purchasing of green products and the use of public transportation. While environmental degradation disproportionately affects the poor, they also cannot afford the proposed solutions such as carbon taxes, green products, electric cars, or even alternative modes of transportation due to impoverished infrastructure (Laidley, 2013). Thus, people who have low economic and social capital are more likely to consider climate change to be an issue that is exaggerated, expensive, and difficult to address. They are also more likely to perceive going green as a fad or a fashion statement, as only the rich can afford to care about clean environment because they do not have to worry about hunger, thirst, shelter, or safety (Laidley, 2013).

Social dominance orientation. Many of the effects of power distance influence pro-environmental behaviours at the cultural or systemic level, affecting institutions, norms, and beliefs in what is possible. But as the GLOBE studies suggest, when it comes to power distance, there is a friction between cultural practices and individual values, where individuals within cultures are much more interested in equality and egalitarianism than cultural practices of their country allow (House, et al., 2004). At the psychological

level, power distance manifests itself as social dominance orientation (SDO), or "the degree to which individuals desire and support group-based hierarchy and the domination of 'inferior' groups by 'superior' groups" (Sidanius & Pratto, 1999, p. 48). SDO consists of two factors – desire for hierarchy and desire for equality (egalitarianism).

Individuals who are highly hierarchical are more likely endorse the anthropocentric view, to see environmental destruction as part of their human right, to justify the current system, and to deny the existence of climate change (Häkkinen & Akrami, 2014; Jylhä & Akrami, 2015). Researchers have found that individuals who are hierarchy-oriented show low environmental concern and less willingness to make personal sacrifices for the environment (Jylhä & Akrami, 2015; Milfont et al., 2013; Milfont & Sibley, 2014; Milfont & Sibley, 2016; Stanley, Wilson, Sibley, & Milfont, 2017) On the contrary, those who are egalitarian are more likely to endorse a social justice orientation, pro-environmental attitudes, and behaviours (Patchen, 2010). Those who perceive inequality as an injustice (and are part of an advantaged group within the unjust system) are more likely to become angry and show intent to act on behalf of disadvantaged groups. However, those who are in a disadvantaged group are less likely to be angry, more likely to accept injustice, and less likely to show collective pro-environmental intention (Saeri, Iyer, & Louis, 2015). Cameron and Nickerson (2009) suggest that the link between social dominance orientation and collective pro-environmental behaviour is mediated by social identity.

Summary and limitations of culture and pro-environmental behaviour. The cultural approach to studying pro-environmental behaviour has thus far been predominantly the work of sociologists and the few attempts that have been made in

psychology are so far not integrated within a framework of research that exists on environmental behaviour. The reviewed literature suggests that at the cultural level, individualism-collectivism and high power distance can create conditions where environmental abuse is more likely to occur, where denial of responsibility is fostered, and individually based mitigation strategies that maintain the status quo are more likely to be promoted. At the individual level, however, self-construals and egalitarianism play an influential role in norms, beliefs, and pro-environmental behaviours. Independent self-construal influences personal values and goals, and appears to encourage pro-environmental behaviours despite conflicting social norms and cultural messages. Interdependent self-construal focuses on group goals, increases cooperation with others, and leads to higher adherence to social norms. Metapersonal self-construal allows for stretching of the self-concept (Postmes, Rabinovich, Morton, & Van Zomeren, 2014) to see the self as one with nature and other people. Lastly, preference for equality leads to acknowledging unfair distribution of resources and a desire to change the status quo. Together these constructs could provide valuable information about pro-environmental attitudes, beliefs, and behaviours.

Present Study

The goal of the present study is to address the limitations of the VBN, TPB, and SIMCA models by synthesizing them into a single model that addresses the full spectrum of pro-environmental behaviour and accounts for potential cultural variation. Although the three models have some overlap, they also have some differences. The VBN model focuses on individual values and the SIMCA model on social identity. The self-construal (independent, interdependent, and metapersonal) and power distance constructs also

address one's identity and values using a cultural lens. Therefore, the proposed social

model of environmental action (SMEA, see Figure 6) groups these constructs together

under one latent construct of Self-Concept. The proposed model combines efficacy

beliefs using individual and collective indicators from the VBN and SIMCA models.

Norms are measured similar to the TPB, as external to the individual and included

indicators of injunctive, descriptive, and moral norms. Lastly, pro-environmental

behaviours include individual, public, and collective indicators.
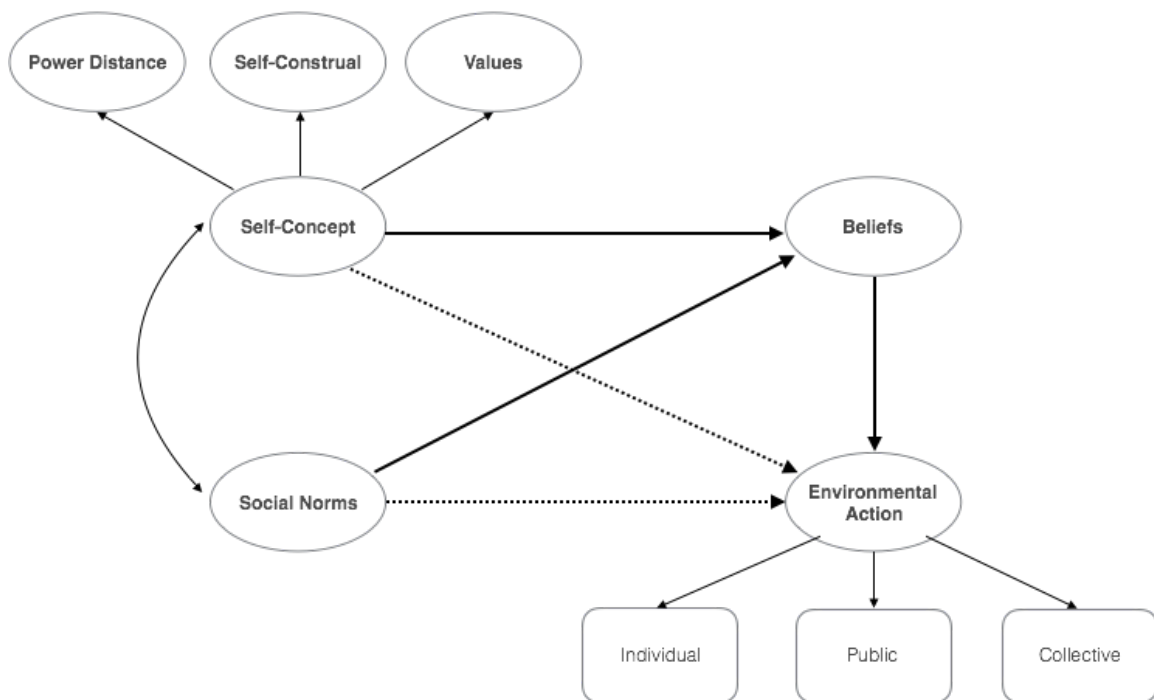
Figure 6. Proposed social model of environmental action (SMEA)

The proposed model is tested against previous models of pro-environmental

behaviour to confirm both the factor structure as well as the structural relationships

between the constructs. The hypotheses are as follows:

Confirmatory Factor Analysis. The proposed model hypothesized a 7-factor

structure (The full measurement model can be found in Appendix A). For Hypothesis 1 it

was expected that:

- Independent, interdependent, and metapersonal self-construals would load on the Self-Construal factor

- Social dominance orientation subscales would load on the latent Power Distance factor (scored as Egalitarianism)

- Traditionalism, openness, self-transcendence, and self-enhancement subscales would load on the latent Values factor

- Power Distance, Self-Construal, and Values would load on a second-order latent factor of Self-Concept

- Collective efficacy (CE), personal efficacy (PE), awareness of consequences (AC), perceived obligation (PO), and environmental concern (NEP) would load on a latent factor of Beliefs

- Injunctive, descriptive, and moral norms would load on a latent factor of Social Norms

- Individual, public, and collective behaviours would load on a latent factor of Environmental Action

According to the hypothesized 7-factor model:

H1a-d: The latent factor of Self-Concept would account for more variance in Pro-Environmental Behaviours than a) self-construal alone, or b) values alone, or c) power distance alone, or d) group identification (collectivism) alone

Some researchers suggest that individualism and collectivism bring out different aspects of self that prioritize different values (Verplanken, Trafimow, Khusid, Holland, & Steentjes, 2009). Verplanken and team found that individualists put more emphasis on self-enhancement values, while collectivists emphasized self-transcendence values more,

and that values predicted behavioural intentions better for individualists while social

norms were better at predicting behavioural intentions for collectivists. Schwartz (1990)

suggested that individualism-collectivism might be a second-order latent variable that

encompasses the 10 universal values. The present study explored alternative variations to

compare whether Self-Concept is made up for three latent variables, or whether self-

construal and power distance form Self-Concept, which then influence values (model B

in Appendix A).

      Structural Path Analysis. The structural path of the model tested the causal

relationships between Self-Concept, Norms, Beliefs, and Environmental Action factors.

It is prudent to keep in mind that it is not possible to demonstrate causation with cross-

sectional data (Kline, 2016). While path analysis may be used to determine causation, in

social sciences it is primarily understood to show correlational relationships. The

proposed relationships were as follows:

      H2a: Self-Concept (self-construal, values, egalitarianism) would affect

      Environmental Action indirectly via Beliefs (personal and collective efficacy,

      awareness of consequences, personal obligation, and environmental concern)

      H2b: Social Norms (injunctive, descriptive, and moral) would affect

      Environmental Action indirectly via Beliefs

Kline cautions that mediation as typically construed is not appropriate in the context of an

SEM model, because all variables within the model affect each other simultaneously

(Kline, 2016). Thus, the hypotheses stated above assumed that although there would be

correlations between Self-Concept and reported behaviours as well as Social Norms and

reported behaviours, once the variables were in the model, Self-Concept and Social

Norms would affect Environmental Action through Beliefs and that direct paths would no longer be significant.

Within the context of VBN theory norms are conceptualized as internal attributes of the person instead of the social attributes of the situation (Stern, 2000) whereas in the TPB norms are conceptualized as situational and outside the individual (Ajzen, 1991). There is lack of clarity in regards to whether norms are an exogenous variable or whether they are influenced by one's beliefs and self-concept, which can change the perception of norms. In the proposed model it is hypothesized that norms are external to the individual, and influence beliefs as opposed to vice versa:

H3: Model A (Self Concept and Social Norms as exogenous) would have better

fit than model C (only Self-Concept is exogenous, see Appendix A)

Literature also suggests that collectivists are more attuned to norms (Jacobson, 2010) and are more likely to follow norms (Chen et al. 2007), while individualists are more aloof about norms (Van Baaren, Maddux, Chartland, de Bouter, & van Knippenberg, 2003), are less likely to follow norms when they perceive them (Bond & Smith, 1996), or may even take advantage of everyone else following norms in order to benefit the self (Chen et al. 2007). In addition, individual attitudes are less likely to influence behaviours for those who value power distance because situations that have high power distance have strong situational norms that dictate behaviour more than personal attitudes (Daniels & Greguras, 2014). This suggests a possible interaction between Self-Concept and Social Norms (see model D in Appendix A), such that:

H4a: The effect of Social Norms on Environmental Action would be moderated

by Self-Concept

H4b: The effect of Social Norms on Beliefs would be moderated by Self-Concept

The proposed model was also compared to the VBN, TPB, and SIMCA models. Since the SMEA used indicators from all three models, it could be tested against each model independently to compare which model accounts for the most variance in self-reported pro-environmental behaviour:

H5a: The proposed model would account for more variance in self-reported pro-environmental behaviours than the VBN model

H5b: The proposed model would account for more variance in self-reported pro-environmental behaviours than the TPB model

H5c: The proposed model would account for more variance in self-reported pro-environmental behaviours than the SIMCA model

Implications

Findings from this study will help in the pursuit of a pro-environmental behaviour model that avoids individualism bias by incorporating the concepts of collectivity and cultural sensitivity throughout the model. Few previous models have attempted to bring together the individual and collective action literatures, which could have profound implications in this area of study, as behaviours are not neatly separated into different life domains and governed by separate values and mechanisms. Likewise, although the influence of cultural variables on pro-environmental behaviour has been studied, few attempts have been made to incorporate them into the theoretical models of pro-environmental behaviour. The present study focused on synthesizing multiple literatures in an effort to seek culturally sensitive solutions to a global problem.

CHAPTER III

METHODS

Sample

A sample of 500 American adults recruited through Amazon Mechanical Turk

(AMT) platform completed the questionnaire. Data from 15 participants were removed

because they violated data quality standards: choosing the same answer for every

question, alternating between a small number of answers in a regular pattern, or taking

significantly shorter time than average to complete the survey (Mason & Suri, 2012). A

final sample of 485 (M_{age}= 36.94, SD=12.93) was analyzed. According to Gagné and

Hancock (2006), the sample size for *SEM* should be linked to the anticipated latent

variable reliability rather than the number of parameters. As calculated by Jackson, Voth,

and Frey (2013), a model such as the one proposed in this study, with 7 latent factors

with reliabilities of at least α=.40 that have 3-4 indicators each, requires sample size of

200-400. Thus the present study had a sample size large enough to have adequate power

to conduct the analyses.

The present sample consisted of 280 women (M_{age} = 37.89, SD=13.61, range: 18-

84) and 203 men (M_{age} = 35.59, SD=11.85, range: 18-75) and one non-binary person

(age=31). Sixty-seven percent of participants said that they identify or strongly identify

with American culture. Participants were from all across the United States. The states

were classified into regions based on Vandello and Cohen (1999) cultural regions. To

find breakdown of respondents by region see Table 1.

Table 1

Percent of Respondents by Region

Region	Percent of respondents
Confederate South (South Carolina, Mississippi, Florida, Alabama, Georgia, Louisiana, Texas, Tennessee, Arkansas, Virginia, and North Carolina)	28.7
Peripheral South (Delaware, Maryland, West Virginia, Kentucky, Missouri, and Oklahoma)	7.8
Northeast (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, and Pennsylvania)	8.5
New York and New Jersey	7
Midwest and Great Lakes (Ohio, Michigan, Wisconsin, Indiana, Illinois, Iowa, and Minnesota)	14.8
Mountainwest and Great Plains (Montana, Wyoming, Colorado, Idaho, Washington, Oregon, Alaska, North Dakota, South Dakota, Nebraska, and Kansas)	7.8
Southwest (New Mexico, Arizona, Nevada, and California)	14.4
Utah	0.6
Hawaii	0.4
Unspecified	9.9

The sample under-represented Black and Hispanic voices, had higher

unemployment rate than the general American population, had less than average income,

and higher than average education (United States Census Bureau, 2015). Regarding

employment status: 61.4% of participants in the sample were employed full time, 15.5%

were employed part time, 17.9% were unemployed, and 4.7% preferred not to answer.

The annual household income was less than average: 27.6% earned less than $30,000,

22.7% earned between $30,000 and $50,000, 19.8% earned between $50-70,000, and

11.1% earned more than $100,000. The median household income was $30,000-$50,000

while the most frequent income category (mode) was less than $30,000. According to the

United States Census Bureau (2015), the median household income of general population

in the United States is $53,482. In the sample, 99% of participants have graduated high

school and 56.7% have bachelor degree or higher. According to the Census (2015),

86.3% of general population have graduated high school and 29.3% have bachelor degree

or higher. A detailed list of demographic characteristics can be found in Table 15 in

Appendix E.

Although these demographics are typical of AMT samples, they are not

representative of the general population, as three quarters of American students (age 18-

24) who graduate with a college degree come from high income families, and only 10%

of college graduates have family income of $35,000 or less (The Pell Institute, 2016).

The implications of this atypical sample for testing the social model of environmental

action are that they might differ from other highly educated but more wealthy

counterparts in terms of available infrastructure to support pro-environmental action, may

have a different set of concerns around the environment, and cannot afford a lot of the

behavioural solutions that are typically proposed. These mediating factors may dampen

the effect size of relationships between variables. Nevertheless, AMT samples such as

this one are found to be closer to the general American population than samples recruited

from University participant pools (Paolacci et al., 2010).

There is one more characteristic that makes the current sample atypical – very

high conservatism. On the measure of conservatism/liberalism, there were zero

participants who identified themselves as liberal or very liberal, 32% identified as

moderate, 44% as conservative, and 23% as very conservative. According to recent polls

11% of American adults identify as very liberal, 16% as somewhat liberal, 30% as moderate, 22% as somewhat conservative and 14% very conservative (7% declined to answer, Pew Research Center, May 2017). However, conservatism does not appear to be correlated with political party identification or views on social, economic, or especially environmental issues (refer to Table 16 in Appendix F). Except for the very conservative, who primarily identified as Republicans, 85.6% of Democrats identified as conservative, whereas 62.8% of Independents identified as moderate. This suggests that the issue may lie with the term "liberal" which has several negative associations, including: "liberal elite" to describe rich people who have abandoned the regular people who are struggling in poverty, but are obsessed with political correctness; neoliberalism, or the "selling out" of the American people and the environment for profit; and "libtards" the aggressive pejorative used by the very conservative to attack those who identify as a liberal as a result (Wismayer, 2017). In order to mitigate data issues such as this, the present study used multiple measures to triangulate the participants' stance on politics, including party affiliation, and views on social, economic, and environmental issues.

Recruitment

Participants were surveyed using a web-based questionnaire distributed through Amazon Mechanical Turk (AMT), which is a market platform available only to US residents that allows employers (in this case, the researcher) to temporarily hire people for online jobs called Human Intelligence Tasks (HITs, in this case the survey) in return for small monetary payments. There were no restrictions to participation as long as participants were adults (18+ years) and lived in the United States. Recruitment was targeted using pre-screening criteria so that only those who met the criteria saw the HIT

posting. Participants (called "workers" on the platform) were paid $0.75 for the 10

minutes (or less) that it took them to complete the survey. Rewards on the platform

typically range between $1-2 per hour (Paolacci, Chandler, & Ipeirotis, 2010). Workers

and employers are anonymous, with only an ID provided by Amazon. Participant

motivations are reportedly for money, entertainment, and to kill time, with 69% of

participants reporting that they consider AMT "A fruitful way to spend free time"

(Paolacci, et al., 2010, p.413). There is however, a substantial minority (14%) of

participants who complete thousands of HITs, with AMT as their primary source of

income (Paolacci et al., 2010).

AMT has been used by researchers in psychology to conduct survey research and

has been published in top-tier peer-reviewed journals. Responses from AMT samples are

found to be reliable, psychometrically valid, with many traditional psychological studies

having been successfully replicated with AMT samples (Paolacci & Chandler, 2014).

Overall, data collected through AMT are found to be of good quality because workers

have to maintain a good reputation on the platform (Paolacci & Chandler, 2014; Peer,

Vosgerau, & Acquisti, 2014) and because an employer can withhold payment or block a

worker for incomplete work (Paolacci et al., 2010). The completion rate for the present

study was 95% with minimal missing data and reliability was on par with other types of

samples (Buhrmester, Kwang, & Gosling, 2011).

Measures

All measurement instruments can be found in Appendix B.

Power distance (SDO). The psychological-level variable that reflects power

distance is social dominance orientation, which measures preference for social

hierarchies (Jylha & Arkami, 2015). Social dominance orientation was assessed using

the SDO7 (Ho et al., 2015) scale. This measure asked about the participant's preferences

for intergroup inequality and consisted of 2 subscales: dominance and egalitarianism.

These subscales are found to be theoretically distinct. The dominance subscale measured

values that oppress lower status groups; the egalitarianism subscale measured belief in

hierarchy-enhancing ideologies. Tests of predictive validity suggest that dominance is a

better predictor of racism, while egalitarianism is a better predictor of system justification

(bias toward maintaining the status quo). In support of content validity this measure was

compared to HEXACO, which measures the Dark Triad personality traits. Correlation

research suggests that high dominance is related to less honesty-humility, increased

competition, and lower empathy, while egalitarianism is related to Machiavellianism, and

negatively related to harm and fairness (Ho et al., 2015). Both subscales are related to

environmental problems: research suggests that those who highly value inequality and

hierarchy are less likely to endorse pro-environmental attitudes and behaviours (Milfont

et al., 2013).

Each subscale is comprised of four items that are positively scored and four that

are reversed scored. An example item of a Social Dominance (SD) item is "Some groups

of people must be kept in their place", and example of Social Egalitarianism (SE) is

"Group equality should be our ideal". An example item of Social Dominance Reversed

is "No one group should dominate society", and an example of Social Egalitarianism

Reversed is "Group equality should not be our primary goal". Items that were phrased to

favour dominance and hierarchy (SD and SER) were reverse-scored for the analyses, so

that all subscales indicated higher preference for equality. All items were rated on a 7-

point Likert scale (*1 – strongly oppose, 7 – strongly favour*). The SDO measure had good

internal reliability with Cronbach's α = .91 for dominance and α = .92 for egalitarianism.

Self-construals. Independent and interdependent self-construals were assessed

using the Self-Construal Scale by Singelis (1994). This measure consisted of two 12-

item subscales: the Interdependent Self-Construal subscale measured to what extent the

individual construed themselves in terms of their social group, and the Independent Self-

Construal subscale measured to what extent participants construed themselves as separate

individuals from others. The two subscales are orthogonal (can be high or low on both,

Singelis, 1994).

This measure is based on Triandis's (1989) and Markus and Kitayama's (1991)

conceptualizations of individualism and collectivism at the individual level of analysis. It

incorporates aspects of the construct as outlined by these major theorists in the area, such

as: respect for authority, harmony, modesty, deference to the group in decision making

for interdependent self-construal as well as directness, independence, and self-

consistency across situations for independent self-construal. The construct validity of the

measure has been tested in different cultures that are said to differ in individualism and

collectivism. Some studies found that participants from collectivist countries tend to

score higher on interdependent self-construal and participants from individualist

countries score higher on independent self-construal (e.g., Ozawa, Crosby & Crosby,

1996, Singelis, 1994) however there are also studies that find that there are no differences

between samples in different cultures, although there can be individual differences

(Levine, Bresnahan, Park, Lapinsky, Wittenbaum, Shearman, Lee, Chung, & Oashi,

2003). The present research was interested in individual differences on these measures,

and the differences between individuals in terms of self-construals are much more robust than cross-cultural differences. For example, participants who score high on independent self-construal and low on interdependent self-construal are more egotistic, while those who score high on interdependent self-construal are found to be more altruistic, which could in turn influence pro-environmental behaviours (Davis & Stroink, 2016).

The measure used a 7-point Likert scale (*1 – strongly disagree, 7 – strongly agree*). A sample independent self-construal item includes "Being able to take care of myself is a primary concern for me" and a sample interdependent self-construal item is "My happiness depends on the happiness of those around me." Both subscales have good reliability with Cronbach's α =.80 for independent self-construal and α = .84 for interdependent self-construal.

Metapersonal self-construal (M). To measure the third type of self-construal, the Metapersonal Self Scale (MPS) by DeCicco and Stroink (2007) was used. Their research suggests that defining the self to include all other beings is more predictive of environmental attitudes and behaviours than the other two self-construals. Validation tests for this instrument found that metapersonal self is negatively correlated with intolerance for ambiguity and racism, and that it is moderately correlated with the other two self-construals. This measure consists of 10 items such as "I feel a real sense of kinship with all living things" and was rated on a 7-point Likert scale (*1- strongly disagree, 7 – strongly agree).* Reliability in the present sample was very high, Cronbach's α = .89.

Values. Values were assessed using the 23-item Brief Inventory of Values (Stern, Dietz, & Guagnano, 1998), a shortened version of the original 56-item Schwartz Value

Survey that measured all four of the original value clusters: self-transcendence (ST, e.g., "respecting the earth"), tradition (T, e.g., "honoring parents"), self-enhancement (SE, e.g., "wealth"), and openness (O, e.g., "an exciting life"). The instrument developers conducted criterion validation of the Brief Inventory as compared to the full inventory, and found that the two versions of the measure had parallel predictive power for political behaviour, consumer behaviour, and willingness to sacrifice behaviours, all of which are outcomes measured in this study.

The measure asked participants to rate how important each item was as a guiding principle in their life, using a 7-point Likert scale (*1 – not important, 7- extremely important*). In the present sample, the instrument had high reliability, with Cronbach's alpha for self-transcendence at $\alpha = .91$, tradition $\alpha = .89$, openness $\alpha = .86$, and self-enhancement $\alpha = .83$.

Beliefs. *Personal efficacy beliefs (PE).* Personal efficacy is a belief outlined in all three models, the VBN, TPB, and SIMCA, and measures the individual's sense of whether their behaviour can make a difference. Personal efficacy beliefs were measured using 4 items from Van Zomeren, Saguy, and Schellhaas (2012). Items were rated on a 7-point Likert scale (*1- strongly disagree* and *7 – strongly agree).* A sample item is "I believe that I, as an individual, can contribute greatly so that as a group we can mitigate climate change." The construct was found to be conceptually distinct from collective efficacy, predicting unique variance of collective action tendencies. Items had Cronbach's $\alpha = .97$ in the present sample suggesting that items may be redundant.

Awareness of consequences (AC). Awareness of consequences is a belief outlined in the NAM and VBN models. Perceived threat as measured by this construct is

thought to be the link between the individual's values and behavioural norms. A 4-item measure from Stern et al. (1999) was used to assess this belief. This instrument has face validity, and loads on a separate factor from personal values and is highly correlated with personal obligation (r=.63). Participants were asked to rate items such as "Do you think climate change will be a problem for you and your family?" on a 7-point Likert scale with anchors *1 – not a problem* to *7 – very serious problem*. Cronbach's alpha was .94 in the present sample.

  Personal obligation (PO). Personal obligation is a belief outlined in the NAM and VBN models. One item from Stern et al. (1999) was used to assess this belief: "I feel a personal obligation to do whatever I can to prevent climate change" using a 7-point Likert scale with anchors *1 – strongly disagree* to *7 – strongly agree*. A way to assess the reliability and validity of a single-item measure is to check whether it correlates with measures of similar constructs or a longer measure of the same construct (Fisher, Matthews, & Gibbons, 2016; Postmes, Haslam, & Jans, 2013). In the present study, PO was highly correlated with personal efficacy (r=.75) moral norm (r=.60) and individual intention to act (r=.68).

  Environmental concern (NEP). Environmental concern (VBN, TPB) was measured using the New Ecological Paradigm scale by Dunlap, Van Liere, Mertig, and Jones (2000). The NEP was originally published in 1978 and has since been widely used to measure environmental concern and has been revised several times, most recently in 2000. The items in the instrument tap into beliefs about humanity's ability to upset the balance of nature, and have been found to strongly discriminate between individuals who have pro-environmental orientation vs. the general public (referred to as known-group

validity). This instrument has been successfully used with general public and special interest groups, and tested in a variety of different populations including the US, Canada, Sweden, Japan, Spain, and others. This instrument has been shown to predict pro-environmental intentions and behaviours. In terms of content validity, this measure has been compared to ethnographic studies examining of environmental perspectives in Americans. The scores on this measure also positively correlate with political liberalism and negatively with authoritarianism.

The NEP scale consisted of 15 items rated on a 7-point Likert scale (*1 – strongly disagree* and *7 – strongly agree*). A sample item includes "Humans have the right to modify the natural environment to suit their needs." Cronbach's reliability coefficient was $\alpha = .90$ in the present sample.

Collective efficacy beliefs (CE). Collective efficacy measures the belief that group action is effective at bringing about change (SIMCA). Collective efficacy has been found to predict collective action tendencies independent of group identification, is negatively related to violent modes of action and is not found to be related to public behaviours such as signing petitions. These results suggest that collective efficacy is an important predictor of collective pro-environmental behaviour but is distinctly different personal efficacy. It was measured using 4 items adapted from Van Zomeren, Postmes, and Spears (2012). Items, such as "As people, I think we can mitigate climate change" were rated on a 7-point Likert scale with anchors *1 – strongly disagree* to *7- strongly agree*. Cronbach's α was .97 in the present sample, which suggests that items may be redundant.

Norms. Three types of norms were measured: Injunctive, descriptive, and moral. *Injunctive norms* (INJ) were based on the TPB and measured the perceived expectations of important others to perform a behaviour via item "Would people from your community that are personally important to you expect that you behave in environmentally-friendly way?" *Descriptive norms* (DES) were based on the observed behaviour of others via item "How likely is it that people from your community that are personally important to you themselves behave in environmentally friendly way?" Each item was rated on a 7-point Likert scale with *1 – extremely unlikely* and *7 – extremely likely*. Reliability in the present study was high, Cronbach's α = .85 (for both items together). Other studies with similar measures report similar reliabilities.

Moral norms (MO) moral norms about environmental behaviour have been typically measured using items referring to individual's attitudes and values (in particular, personal obligation e.g., see Stern et al., 1999). However, in the present study these measures would have too much overlap with other belief measures. In the present study, moral norms were defined as a manifestation of social phenomenon because one's perception of what is moral is deeply influenced by society and influential others. Kaiser, Schultz, Berenguer, Corral-Verdugo, & Tankha (2008) suggest that moral norms can be indirectly measured using social emotions as individuals may feel embarrassed, ashamed, angry, or afraid of social sanctions if they or someone else violate what is considered a moral norm. Kaiser et al. (2008) found that these emotions increased ability to predict behavioural intention in addition to the other two types of norms as well as attitudes. In the present study, moral norms were assessed using 4-items that measured group-based guilty conscience from Rees and Bamberg (2014), whose research found this construct

predicted unique variance of collective behaviour. Three items measure guilt: "I feel guilty about how we humans are treating the environment," "Sometimes, I feel ashamed when I realize what we leave behind for future generations," and "I am ashamed of what future generations might think of us because of our environmental behavior" and one item measures anger ("When thinking about environmental protection, I am angry at politics"). This measure had reliability of Cronbach's α = .95 in the present sample.

Pro-environmental behaviour. Both the individual and collective theories of pro-environmental behaviour focus on predicting behavioural intention as opposed to actual behaviour. Stern argued that this is because intent is one independent cause of behaviour that is predicted by dispositional factors (Stern, 2000). According to Ajzen (1991) intentions capture motivational factors, while perceived efficacy due to situational factors influences whether intention translates into actual behaviour. However, there are other studies that have used a measure of self-reported past behaviour instead of intention with positive results. For example, Nordlund and Garville (2002) tested a model very similar to VBN (with the inclusion of additional values) and its effect on self-reported pro-environmental behaviour. Their model explained 21% of the variance in self-reported behaviour, which is somewhat lower than studies that use measures of intention. Bamberg and Möser's (2007) meta-analysis found a mean correlation of .52 between behavioural intention and self-reported pro-environmental behaviour. In the present study participants completed two versions of the outcome measures – first phrased to ask about future intentions to act, and the second asked to self-report on past behaviour.

According to Stern (2000), pro-environmental behaviours can be meaningfully split into three types: individual consumption behaviour, public behaviour, and

collective/activist behaviour. However, different studies sometimes classify public and collective behaviours differently.

　　　　Individual behaviour (IND). Using the same measurement as Stern et al. (1998), personal behaviours were measured using 7 items, such as "How often do you avoid buying products from a company that you know might be harming the environment?" rated on a 7-point Likert scale with anchors *1 – all the time* to *7 – never*. Scale reliability in the present sample was $\alpha = .88$. Participants were asked about behaviour they have performed within the last six months in the behaviour version. In the intention version they were asked about how likely they are to perform these behaviours in the next six months.

　　　　Public behaviour (PUB). Public behaviour was assessed using Stern et al.'s (1998) self-report checklist of behaviours. Sample behavioural items include: "Signed a petition in support of promoting the environment." This measure was created in the 1990s when social media use was not widespread. However, social media is now arguably one of the most widely used and visible platforms for public behaviour where people share articles, petitions, etc. Thus, in the present study, this measure has been modified to include the social media item "Shared any stories about climate change or sustainability on social media" which follows the same wording as Stern's question on traditional media use. Participants were asked to check each type of behaviour they have performed within the last six months in the behaviour version. In the intention version they were asked to check which behaviours they are likely to do in the next six months. Cronbach's alpha is not an appropriate metric for a list of varied behaviours; however, validity can be established by examining correlations among related variables. In the

present study, as was expected, self-reported public behaviours were correlated with

other types of self-reported behaviours (both individual and collective), as well as

awareness of consequences, self-transcendence values, social egalitarianism, and efficacy

beliefs. See correlations in Table 5.

    Collective behaviour (COL). Collective behaviour was defined as taking action

as a joint effort with others to work toward a common goal. In the environmental

behaviour literature specifically, collective action has been typically defined as political,

and involves behaviours such as petition signing, attending protests, and joining

environmental groups (Stern, 1999; van Zomeren et al., 2012). The collective action

measure used in this study was adapted from Van Zomeren and team (2012). In the

present study the items were rephrased using Stern and team's (1998) format to match

public behaviours checklist. In addition, van Zomeren et al. (2012) included an item

about petitions in the list of collective behaviours, which was removed, as it was already

included in the measure for public behaviour. Additional behaviours that could be

considered as collective participation, such as recruitment of others, active support of

environmental movements, and organizing group action were added. The final version

contained a list of 6 items such as "Participated in a climate change demonstration."

Participants were asked to check each type of behaviour they have performed within the

last six months in the behaviour version. In the intention version they were asked to

check which behaviours they are likely to do in the next six months. Self-reported

collective behaviours (and intentions) were correlated most highly with self-reported

public behaviours and intentions, followed by self-reported individual behaviours, as well

as personal obligation to act, efficacy, and metapersonal self-construal. See correlations in Table 5.

   Covariates/Demographics. *Knowledge.* Research suggests that climate change knowledge influences belief in climate change, such that those who know more about the causes of climate change are more likely to believe that climate change is occurring, and even attenuates the link between free-market ideology and climate change belief (Guy, Kashima, Walker, & O'Niell, 2014). Climate change knowledge was assessed using a 9-item measure that lists possible causes of climate change (5 real causes and 4 myths). Participants could pick one of three response options: cause, not a cause, or don't know. Causes and myths loaded on different factors with reliabilities $\alpha = .84$ for true causes and $\alpha = .77$ for myths in the present study.

   Gender and political affiliation. Davidson and Haan (2012) studied environmental attitudes and beliefs in Alberta, Canada, the home of a major extractive industry known as the tar sands and found that SES, gender, and political identification all influenced environmental attitudes and beliefs in climate change. Liberal political views predict higher commitment to climate action for those who view climate change as a moral issue (Gifford & Nilsson, 2014). Other studies found that women show higher concern for the environment (Dietz, Stern, & Guagnano, 1998). Standard demographic information that includes SES, gender, and political affiliation was also collected. Political affiliation was assessed in multiple ways to distinguish between ideology and party affiliation.

Procedure

 Participants who chose to participate in the online survey via the AMT website were redirected to a survey link on the Fluid Surveys website where they were asked to read a Letter of Information (Appendix C). Participants who chose to complete the survey indicated their consent by clicking a box to indicate 'I agree to participate' and continued to the questionnaire. If instead they clicked a box to indicate 'I do not agree to participate' they were redirected away from the survey.

 At the conclusion of the survey, participants were thanked for their time and directed to a Summary Letter that included an overview of the purpose and goals of the study, and their payment information (Appendix D). AMT reserves the right of the employer to review the results before the participants were paid so that if there is evidence that the participant did not properly complete the survey they do not get paid. The researcher reviewed all incoming surveys within 24 hours before processing their payment.

CHAPTER IV

ANALYSIS

Diagnostics and Assumptions

Before conducting *SEM*, data were screened for outliers and missing data, and to ensure that the fundamental assumptions of *SEM* were met.

The presence of many extreme data points can influence normality of the sample distribution. While univariate outliers can be spotted using *Z*-scores, Kline (2016) recommends using *Mahalanobis Distance* to examine data for multivariate outliers. STATA package called "bacon" based on *Mahalanobis Distance* with conservative criteria of $p<.001$ was used to identify multivariate outliers (Weber, 2010). No outliers were present. All analyses were therefore performed using the full data set.

Data were screened for missing values, which can bias the conclusions if they are missing in a systematic pattern. Researchers identify three types of missing data patterns: Missing Completely at Random (MCAR) where loss of data is unsystematic, Missing at Random (MAR) where loss is measured and predictable, such as relating to specific demographics; and finally Missing in Non-Random pattern (NMAR) where outcome data are systematically missing (Kline, 2016). There are a variety of ways to address missing data, with the simplest being listwise deletion, which excluded cases with missing values from the dataset (Byrne, 2010). If 5% or less of data are missing, it does not make a difference which methodology is used (Kline, 2016). As only 5% of data were missing in the present sample, listwise deletion was used.

The dataset was also examined to ensure it meets assumptions of *SEM,* which include independence of observations, multicollinearity, normality, linearity, and homoscedascticity (Kline, 2016).

Independence of observations. Independence of observations assumes that the data from each individual in the dataset are unrelated to the data of other individuals in the dataset. As there is no way to accurately ensure complete independence, it is usually assumed when random sampling is used to recruit participants. As the present survey was conducted online through a data collection platform and participants appear to be randomly distributed throughout the United States, it is fairly safe to assume that respondents were independent; although there is a small possibility that participants shared the survey with someone they know who may have also completed the survey. Even if this occurred, all participants likely had the option to complete the survey on their own and any impact of participants knowing each other would have been canceled out by the variability of people who completed the survey, thus the assumption of independence of observation likely remains upheld.

Multicollinearity. Multicollinearity occurs when independent variables are highly correlated with each other, increasing the possibility that they are measuring the same construct. Correlation coefficients were examined to see if any independent variables shared correlations higher than .80 (Field, 2009). The largest correlations observed between predictor variables were .70 between different types of efficacy. However, the correlations between the two types of individual level outcomes – intentions and self-reported behaviours was .82 which may suggest a small order effect where answering questions about intentions may have influenced participants' responses

on the self-report behaviour questionnaire in a consistent manner. However, correlations between public and collective intentions and behaviours are lower than individual outcomes, and for all three types of outcomes participants reported that they performed fewer behaviours than they intended, as would be expected. For the analyses, only one set of outcomes, self-reported behaviours, was used, however all analyses were double checked with intentions as outcomes as well, and any discrepancies were reported.

Multivariate normality. *SEM* assumes that data fit the assumption of multivariate normality, which means that all univariate distributions are normal, all bivariate distributions are normal, and all bivariate scatterplots are linear and homoscedastic. The large sample size makes standard errors very small and thus increases the chances that even small deviations in skewness and kurtosis are significant, and thus significance tests are not generally helpful (Kline, 2016). It is recommended to examine skewness and kurtosis values, as well as visually examine distribution plots to gauge normality. Table 2 shows the skewness and kurtosis of univariate distributions.

Table 2

Skewness and Kurtosis Values for Study Variables

Variable	Skewness	Kurtosis
Independent self-construal	-.17	-.41
Interdependent self-construal	-.46	.97
Metapersonal self-construal	-.44	-.09
Social Dominance	-.73	-.58
Social Dominance Reversed	-.66	-.03
Social Egalitarianism	-.91	.51
Social Egalitarianism Reversed	-.49	-.61
Self-Transcendence values	-1.16	1.50
Tradition values	-.80	.41
Self-Enhancement values	-.07	-.48
Openness values	-.96	.92
Environmental concern	-.16	.06
Personal efficacy	-.60	-.27

Collective efficacy	-1.17	1.21
Awareness of consequences	-1.14	.56
Personal obligation	-.62	-.49
Injunctive norms	-.42	-.59
Descriptive norms	-.43	-.36
Moral norms	-.86	-.05
Individual intention	-.59	-.14
Individual behaviour	-.19	-.58
Public intention	.28	-1.03
Public behaviour	1.01	.45
Collective intention	1.58	2.73
Collective behaviour	2.33	8.02

All independent variables and the individual level outcome variables appear to be somewhat negatively skewed, which means more responses are above the mean, than below. The public and collective outcome variables however, are all positively skewed, suggesting fewer people reported having numerous experiences with public and collective behaviours.

Visual examination of Q-Q plots suggests that there is systematic deviation from normality on almost every variable except self-enhancement values and environmental concern. It is fairly typical for survey data using Likert scales to be non-normal (Kline, 2016); the use of Satorra-Bentler correction, which adjusts the Chi-square statistic and standard errors by a factor based on the multivariate kurtosis is recommended (Finney & DiStefano, 2006). The Satorra-Bentler correction makes the analyses robust to non-normality. All analyses were conducted using this correction, unless otherwise specified.

Linearity and Homoscedasticity. Another assumption is that the relationship between independent and dependent variables is linear and that residuals are equal for all values of the predicted dependent variable. Scatterplots were examined to check for possible curvilinear relationships. Homoscedascticity is the assumption that the residual variance is constant across different levels of the predictor variables, which can be

observed by examining residual plots. Heteroscedascticity due to non-normality can be addressed through transformation. The distribution of interdependent self-construal data appears to be heteroscedastic, where low likelihood of pro-environmental intention or behaviour was likely regardless of level of interdependent self-construal, however those who have high intentions or report having performed more behaviours only have high interdependent self-construal. Similar relationship is observed between power distance and collective outcomes.

Lastly, *SEM* is sensitive to the problem of relative variances, where if the ratio between largest and smallest variances is too large, the covariance matrices become ill scaled and do not yield a stable solution (Kline, 2016). The variances of different variables were controlled by using a 7-point scale for all measures.

Variance Across Demographic Groups

Differences in responses were examined across demographic variables of gender, age, education level, income, level of knowledge about climate change, and political affiliation. *Independent t-tests* were conducted to compare differences between these groups and can be found in Table 3.

Gender. Female participants scored lower on social dominance, higher on social egalitarianism, and higher on self-transcendence values than male participants, which was associated with higher intention to participate in public pro-environmental behaviours. Female participants were split on traditional values, with the mean score skewed toward highly traditional, but with a subset of female participants that scored extremely low on traditionalism, suggesting distinguishable subgroups, whereas traditional values for males were closer to normal distribution. Female participants had lower awareness of

consequences of climate change but higher moral norms, suggesting that females who are aware about the impact of climate change feel more angry and guilty than male participants, while males had higher awareness, but felt less guilt and anger.

Age. Research suggests there are differences in pro-environmental behaviour and environmental concern between young people and older adults (Gifford & Nilsson, 2014). To examine whether there are age differences within the sample, participants were split into two age groups: Millennials (defined as people born in 1980 as per Strauss & Howe in Horovitz, 2012) and older (which includes everyone born before 1980). In the present sample, correlations between social dominance, metapersonal self-construal, self-transcendence values, and outcomes is significant for older adults but not for Millennials. There were no generational differences in relationships between egalitarianism, moral norms, and efficacy beliefs and outcomes. However, the relationship between individual-level self-reported behaviours and social norms was stronger for Millennials. Older generations in general, were found to score higher on individual and public intentions and self-reported behaviours, though all generations reported they were equally as unlikely to participate in collective action.

Education. For those with graduate and professional degrees, there was a relationship between metapersonal self-construal and collective intentions that was non-significant for all other groups, suggesting that the link may be highly abstract. The link between awareness of consequences and self-reported collective behaviour was significant only for those with a graduate degree, suggesting that the link between the consequences of climate change and why collective action is needed is also highly abstract and not communicate well with the general public. However, there was a

stronger relationship between injunctive and descriptive norms and lower levels of education; these relationships were not significant for those with graduate degrees.

Income. There were significant differences between SES groups on the relationship between self-construals and outcomes: Interdependent self-construal only influenced individual intention for low-income groups, metapersonal self-construal did not influence self-reported individual behaviour for high income groups, or collective intention for extremely low-income or middle-class participants, but did influence collective intentions for low and high SES. Thus it appears that interdependent and metapersonal self-construals are entangled with socio-economic status. A similar relationship is found for power distance and self-reported behaviours – those in the $30-50,000 bracket and the $100,000+ SES bracket had significant correlation between egalitarianism and pro-environmental behaviour (as well as public intentions), while the extremely low SES and the middle-class brackets had no correlation between egalitarianism and pro-environmental behaviour.

Knowledge. Participants were split into three levels of knowledge groups: low, medium, and high, where 81% of participants were in the medium group, 14% were in the low knowledge group, and 4% were in the high knowledge group. Relationships between various variables (i.e., egalitarianism, all four value subscales) and collective outcomes were found to be significant only for those with high levels of knowledge of the causes of climate change, however relationships between awareness of consequences, social norms and various outcomes was significant for low and moderate knowledge, but not high knowledge groups. Low knowledge group had a strong relationship between moral norms and public intention and self-reported collective behaviour.

Political Affiliation. Political affiliation was examined in regards to whether self-identification as Republican, Democrat, or Independent corresponded to their stance of social issues and level of conservatism. Overall, for Republicans and Democrats there was high correspondence between the political party participants identified with, and their stance on social, and economic issues. Environmental issues and party affiliation were highly correlated for Democrats but not Republicans. Republicans tended to identify as very conservative and Democrats as conservative. Those who identified as Independent had mixed responses depending on the issue, and overall considered themselves more moderate. See the relationship between political identification, stance on social issues and conservatism in Table 16 in Appendix F.

Relationships between social egalitarianism, self-transcendence values, and individual-level outcomes and self-reported public behaviours was significant for Republican and Independent participants but not for Democrats. The relationship between moral norms and individual and collective self-reported behaviour was significant for Republicans and Independents, but not Democrats. The relationship between different efficacy beliefs and awareness of consequences and various outcomes is consistently not significant only for Democrats. Republicans were found to be strongly influenced by social norms when it comes to collective action.

Table 3

Mean Differences Between Demographic Groups on Variables of Interest

Variables	Group	$t(df)$	Cohen's d
Individual intentions	Knowledge (low vs. med)	-4.38 (463)***	.57
	Poli ID (Rep vs. Dem)	-6.86(303)***	.79
	Poli ID (Dem vs. Ind)	4.23 (373)***	.43
	Poli ID (Rep vs. Ind)	-3.05(288)**	.37
Individual behaviours	Knowledge (low vs. med)	-3.07(463)**	.39

	Poli ID (Rep vs. Dem)	-4.93(303)***	.57
	Poli ID (Dem vs. Ind)	2.50(373)**	.25
	Poli ID (Rep vs. Ind)	-2.55(288)**	.31
Public intentions	Gender	-2.21(481)*	.20
	Knowledge (low vs. med)	-5.19 (463)***	.73
	Poli ID (Rep vs. Dem)	-9.47(303)***	1.16
	Poli ID (Dem vs. Ind)	5.83(373)***	.60
	Poli ID (Rep vs. Ind)	-4.39(288)***	.58
Public behaviours	Knowledge (low vs. med)	-3.13 (463)**	.44
	Poli ID (Rep vs. Dem)	-7.90(303)***	1.00
	Poli ID (Dem vs. Ind)	5.41(373)***	.56
	Poli ID (Rep vs. Ind)	-3.51(288)***	.44
Collective intentions	Knowledge (low vs. med)	-2.40(463)*	.34
	Poli ID (Rep vs. Dem)	-5.29(303)***	.68
	Poli ID (Dem vs. Ind)	2.88(373)**	.30
	Poli ID (Rep vs. Ind)	-2.88(288)**	.37
Collective behaviour	Gender	2.27(481)*	.21
	Poli ID (Rep vs. Dem)	-2.20(303)*	.28
	Poli ID (Rep vs. Ind)	-2.21(288)*	.28
Climate change knowledge	Gender	3.23(481)***	.30
	Poli ID (Rep vs. Dem)	-6.46(303)***	.75
	Poli ID (Dem vs. Ind)	3.24(373)**	.33
	Poli ID (Rep vs. Ind)	-3.33(288)***	.41
Independent self-construal	Gender	2.83(481)**	.27
	Age	2.12 (482)*	.20
	Knowledge (low vs. med)	-1.94 (463)*	.24
Interdependent self-construal	Poli ID (Rep vs. Dem)	3.20(303)**	.38
	Poli ID (Rep vs. Ind)	3.22(288)***	.39
Social dominance	Gender	-6.44 (481)***	.59
	Age	3.54 (482)***	.32
	Knowledge (low vs. med)	-2.15 (463)*	.28
	Poli ID (Rep vs. Dem)	-5.61(303)***	.66
	Poli ID (Dem vs. Ind)	4.24(373)***	.43
Social dominance R	Gender	-4.22 (481)***	.38
	Age	2.10 (482)*	.19
	Knowledge (low vs. med)	-3.61 (463)***	.42
	Poli ID (Rep vs. Dem)	-4.96(303)***	.57
	Poli ID (Dem vs. Ind)	3.03(373)**	.31
	Poli ID (Rep vs. Ind)	-2.24(288)*	.26
Social egalitarianism R	Gender	-5.99 (481)***	.55
	Knowledge (low vs. med)	-2.32 (463)*	.30
	Poli ID (Rep vs. Dem)	-7.38(303)***	.86
	Poli ID (Dem vs. Ind)	4.36(373)***	.45
	Poli ID (Rep vs. Ind)	-3.02(288)**	.37
Social egalitarianism	Gender	-4.61(481)***	.42
	Knowledge (low vs. med)	-3.98 (463)***	.49

	Poli ID (Rep vs. Dem)	-6.95(303)***	.79
	Poli ID (Dem vs. Ind)	4.16(373)***	.43
	Poli ID (Rep vs. Ind)	-3.09(288)**	.37
Self-transcendence	Gender	-3.52(481)***	.47
	Age	2.42 (482)*	.22
	Knowledge (low vs. med)	-4.22 (463)***	.51
	Poli ID (Rep vs. Dem)	-5.85(303)***	.66
	Poli ID (Dem vs. Ind)	3.89(373)***	.40
	Poli ID (Rep vs. Ind)	-2.31(288)*	.27
Traditionalism	Gender	-2.10(481)*	.19
	Knowledge (med vs. high)	2.11(414)*	.52
	Poli ID (Rep vs. Dem)	5.11(303)***	.63
	Poli ID (Rep vs. Ind)	4.22(288)***	.53
Self-enhancement	Gender	4.07(481)***	.37
	Age	-4.40 (482)***	.40
	Poli ID (Rep vs. Dem)	3.34(302)**	.41
Openness	Poli ID (Rep vs. Dem)	-2.20(302)*	.26
Environmental concern	Gender	-4.0(481)***	.36
	Knowledge (low vs. med)	-4.94 (463)***	.68
	Poli ID (Rep vs. Dem)	-8.98(303)***	1.06
	Poli ID (Dem vs. Ind)	5.92(373)***	.62
	Poli ID (Rep vs. Ind)	-4.03(288)***	.48
Moral norms	Gender	-2.38(481)*	.22
	Age	-2.33 (482)*	.20
	Knowledge (low vs. med)	-4.57(463)***	.59
	Poli ID (Rep vs. Dem)	-7.92(303)***	.89
	Poli ID (Dem vs. Ind)	5.39(373)***	.55
	Poli ID (Rep vs. Ind)	-2.73(288)**	.32
Personal efficacy	Knowledge (low vs. med)	-4.37(463)***	.57
	Poli ID (Rep vs. Dem)	-5.90(303)***	.68
	Poli ID (Dem vs. Ind)	4.16(373)***	.43
	Poli ID (Rep vs. Ind)	-2.11(288)*	.25
Collective efficacy	Age	-2.42(482)*	.22
	Knowledge (low vs. med)	-5.27(463)***	.70
	Poli ID (Rep vs. Dem)	-8.08(302)***	.90
	Poli ID (Dem vs. Ind)	5.82(372)***	.60
	Poli ID (Rep vs. Ind)	-2.47(288)*	.29
Awareness of consequences	Age	-3.00(482)**	.27
	Knowledge (low vs. med)	-6.81(463)***	.88
	Poli ID (Rep vs. Dem)	-11.89(303)***	1.29
	Poli ID (Dem vs. Ind)	5.92(373)***	.61
	Poli ID (Rep vs. Ind)	-5.82(288)***	.69

* Test is significant at the 0.05 level (2-tailed).

** Test is significant at the 0.01 level (2-tailed).

*** Test is significant at the 0.001 level (2-tailed).

Cohen suggested that d=0.2 be considered a 'small' **effect size**, 0.5 represents a 'medium' **effect size** and 0.8 a 'large' **effect size**.

  Regional differences. Responses were also examined for regional differences. Participants from Hawaii were significantly more interdependent than all other participants. They were also more likely to report participating in public behaviour. No other significant differences were observed among regional groups.

  Although many of the differences between groups have large effect sizes, the groups were not large enough to run separate *SEM* analyses to compare whether the model holds across groups. Limitations of applying the present model to different age, gender, and political groups will be discussed.

Main Analyses

  The model was estimated using a two-step process that first evaluated the measurement component via *CFA* and then the structural component via path analysis. These analyses were conducted using STATA 14.2 (StataCorp, 2015). The model was first submitted to a *CFA* analysis to ensure that it yields the proposed 7-factor solution. Adequate fit was assessed using a combination of Hu and Bentler's (1999) cut off criteria and typical fit values found in the literature. Where the *CFA* model was of poor fit, the covariances between latent factors were examined for discriminant validity, the indicator variances were examined to make sure they are loading on proper factors or if the covariances were too low they were excluded from analyses. Residuals were examined to see if any of them covary. Alternative factor loadings were tested that may fit the data better as proposed in the alternative measurement models (Appendix A).

After a sufficient fit was achieved using *CFA*, the structural model was examined using path analysis. To test whether the data adequately fit the model a variety of model fit indices were examined, including Chi-square, *RMSEA, CFI*, and *SRMR*. Chi-square in *SEM* models is a test for whether the identified model fits the predicted model, and it is therefore desirable for X^2 statistic to be as close to zero as possible, with non-significant X^2 statistic indicating perfect fit (Kline, 2016). As with many models it is not possible to have perfect fit, therefore a significant X^2 statistic alone is not a good indicator of model (un)fit. Similarly, *RMSEA* measures fit (but based on "close" as opposed to perfect fit), with values closer to zero indicating best fit, and values closer to 1 indicating poor fit. Hu and Bentler's (1999) criteria originally suggested 0.05 cutoff criteria with a 90% confidence interval. A threshold of .08 is currently considered appropriate in the literature (Hooper, Coughlan, & Mullen, 2008). Kline (2016) also suggests the confidence interval should not exceed .10 which would indicate problems with the model. *CFI* is a goodness-of-fit statistic with values ranging from zero to 1, with 1 indicating close fit. For example, a *CFI* value of .90 indicates a 90% better fit than baseline model. *SRMR* is a statistic computed using square root of squared covariance residuals with values closer to zero indicating good fit and values larger than .10 indicating poor fit. All model fit indices have their drawbacks and no single index is considered to be the best (Kline, 2016). Typically researchers indicate multiple indices to help assess model fit, and Hu and Bentler (1999) recommend using a combination of two indices to judge model fit, one of which should be *SRMR*.

The fit indices *CFI* and *SRMR*, were used to compare alternative models that were nested (i.e., models with all paths vs. restricted models where paths that are indicated

with dotted lines are set to zero). Typically hierarchical Chi-square can also be used to compare such models, however the significance test is not valid if Satorra-Bentler correction is used to correct for non-normality as it does not use the same Chi-square distribution (Kline, 2016). In order to compare non-nested models (model A vs. model B, model A vs. model C, and model A vs. model D), *Akaike Information Criteria* (AIC, Akaike, 1981) was used. These criteria account for fit and parsimony, with lower values indicating better fit.

Moderation effect was also examined when testing alternative model D. Moderation includes 3 or more variables, where an association between two or more variables is not the same at all levels of a third variable. In the present study, moderation of the influence of norms on beliefs and/or self-reported behaviour by self-concept was tested. In order to assess the effect of moderation, the combined effect of self-concept and norms was represented by a newly created latent variable whose indicators are centered products from norms and self-concept indicators (Steinmetz, Davidov, & Schmidt, 2011).

Lastly, it is worth noting that there may be many equivalent models that could account for the data as compared to the model being tested, and that those equivalent models with different paths would yield the same predicted covariances (Kline, 2016). The proposed model was based on theoretical background and its preferred value over equivalent alternatives will be addressed in the discussion section.

CFA and structural path analyses were conducted with self-reported behaviours as outcomes as there was a .82 correlation between intentions and self-reported behaviours indicating that participants may have answered the two versions of the questionnaire

more or less the same. The results were verified with intentions as outcomes to ensure

that the results are the same. Only negligible differences in values that did not change the

structure of the model were found, and they are not reported.

CHAPTER V

RESULTS

Descriptive Statistics

Means and standard deviations as well as bivariate correlations are presented in

Tables 4 and 5. The present sample appears to be fairly high on egalitarianism values,

which indicates that participants are pro-equality. Participants scored higher than the

scale midpoint on average on values of self-transcendence, traditionalism, openness, and

somewhat lower than other values on self-enhancement. Participant scores on beliefs and

norms were all on average above the midpoint. Individual intentions were somewhat

higher than scale midpoint, however self-reported individual behaviours were right at the

midpoint. Both public and collective outcomes had low scores, with self-reported

behaviours being lower than intentions, as expected. Unfortunately, the rate of self-

reported collective behaviour was very low, which suggests there may be some difficulty

with power when analyzing collective outcomes.

Table 4.

Descriptive Statistics of Study Variables

Variable	N	Range	M	SD
Independent self-construal	485	2-7	5.06	.85
Interdependent self-construal	485	1-7	4.72	.88
Metapersonal self-construal	485	2-7	4.78	1.14
Social dominance*	485	1-7	5.28	1.73
Social dominance (R)	485	1-7	5.50	1.29
Social egalitarianism	485	1-7	5.53	1.39
Social egalitarianism (R)*	485	1-7	5.04	1.64
Self-transcendence values	485	1-7	5.70	1.13
Traditional values	485	2-7	5.77	.93
Self-enhancement values	484	1-7	4.09	1.40
Openness values	484	1-7	5.46	1.24
Environmental concern	485	1-7	4.78	1.07
Personal efficacy	485	1-7	4.61	1.60
Collective efficacy	484	1-7	5.34	1.47
Awareness of consequences	485	1-7	5.33	1.64
Personal obligation	483	1-7	4.76	1.75
Injunctive norms	484	1-7	4.50	1.56
Descriptive norms	483	1-7	4.48	1.45
Moral norms	485	1-7	5.04	1.66
Individual intentions	485	1-7	4.57	1.46
Individual behaviours	485	1-7	3.77	1.32
Public intentions	485	0-6	2.54	1.85
Public behaviours	485	0-6	1.62	1.51
Collective intentions	485	0-6	1.11	1.27
Collective behaviours	485	0-6	.56	.85

* Scores on SD and SER were recoded so that all four subscales of the power distance

measure represent preference for equality, i.e., those who are high on dominance now

have low scores on preference for equality and vice versa. Thus the latent factor of

power distance measures level of Egalitarianism or support for equality.

Table 5.

Bivariate Correlations of Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. IND	1	.03	.35**	0	.11*	.11*	.01	.24**	.22**	.19**	.33**	.10*	.16**
2. COL	-	1	.37**	-.03	.10*	.19**	.07	.26**	.53**	.11*	.11*	-.03	.25**
3. Meta	-	-	1	.06	.14**	.20**	.14**	.46**	.37**	.13**	.23**	.13**	.39**
4. SD	-	-	-	1	.64**	.60**	.65**	.32**	.03	-.35**	.06	.32**	.16**
5. SDR	-	-	-	-	1	.73**	.61**	.47**	.10*	-.29**	.16**	.36**	.29**
6. SE	-	-	-	-	-	1	.73**	.58**	.16**	-.16**	.21**	.42**	.39**
7. SER	-	-	-	-	-	-	1	.50**	.08	-.22**	.12*	.42**	.31**
8. Val_ST	-	-	-	-	-	-	-	1	.31**	-.05	.32**	.53**	.52**
9. Val_T	-	-	-	-	-	-	-	-	1	.22**	.27**	-.08	.14**
10. Val_SE	-	-	-	-	-	-	-	-	-	1	.35**	-.23**	.09*
11. Val_O	-	-	-	-	-	-	-	-	-	-	1	.13**	.26**
12. NEP	-	-	-	-	-	-	-	-	-	-	-	1	.38**
13. PE	-	-	-	-	-	-	-	-	-	-	-	-	1

Variable	14	15	16	17	18	19	20	21	22	23	24	25
1. IND	.15**	.08	.07	.06	.04	.06	.19**	.16**	.13**	.08	.12**	.09
2. COL	.14**	.05	.22**	.28**	.25**	.21**	.23**	.15**	.12**	.09	.10*	.09*
3. Meta	.22**	.15**	.32**	.34**	.31**	.25**	.41**	.37**	.20**	.20**	.29**	.28**
4. SD	.21**	.23**	.26**	.04	.02	.24**	.27**	.10*	.36**	.32**	.20**	.05
5. SDR	.36**	.32**	.36**	.05	.05	.32**	.38**	.21**	.35**	.31**	.22**	.11*
6. SE	.46**	.45**	.44**	.16**	.18**	.46**	.47**	.30**	.43**	.37**	.31**	.20**
7. SER	.43**	.42**	.38**	.09	.10*	.36**	.37**	.22**	.40**	.35**	.26**	.13**
8. Val_ST	.56**	.56**	.55**	.34**	.26**	.63**	.61**	.42**	.51**	.44**	.34**	.27**
9. Val_T	.14**	.01	.11*	.21**	.16**	.12**	.15**	.06	.00	-.05	-.02	-.01
10. Val_SE	-.04	-.01	-.05	.15**	.19**	-.08	-.05	.08	-.11*	-.17**	.04	.07
11. Val_O	.22**	.25**	.19**	.13**	.14**	.20**	.24**	.22**	.19**	.15**	.17**	.10*
12. NEP	.50**	.68**	.47**	.16**	.09*	.68**	.48**	.30**	.53**	.44**	.32**	.14**
13. PE	.70**	.58**	.75**	.36**	.35**	.52**	.64**	.56**	.49**	.42**	.39**	.34**
14. CE	1	.70**	.67**	.25**	.25**	.61**	.57**	.41**	.49**	.39**	.29**	.20**
15. AC	-	1	.63**	.28**	.27**	.69**	.57**	.40**	.55**	.44**	.38**	.26**
16. PO	-	-	1	.39**	.35**	.60**	.68**	.55**	.55**	.46**	.43**	.34**
17. Norm_INJ	-	-	-	1	.73**	.29**	.43**	.42**	.26**	.23**	.30**	.26**
18. Norm_DESC	-	-	-	-	1	.23**	.39**	.40**	.22**	.17**	.24**	.24**
19. Norm_MO	-	-	-	-	-	1	.64**	.47**	.59**	.50**	.43**	.29**
20. I_Int	-	-	-	-	-	-	1	.82**	.64**	.56**	.55**	.42**
21. I_Beh	-	-	-	-	-	-	-	1	.52**	.50**	.54**	.49**
22. P_Int	-	-	-	-	-	-	-	-	1	.77**	.60**	.36**
23. P_Beh	-	-	-	-	-	-	-	-	-	1	.61**	.50**
24. C_Int	-	-	-	-	-	-	-	-	-	-	1	.59**
25. C_Beh	-	-	-	-	-	-	-	-	-	-	-	1

Note. IND – independent self-construal, COL – interdependent self-construal, Meta – metapersonal self-construal, SD – Social

Dominance, SDR – Social Dominance Reversed, SE – Social Egalitarianism, SER – Social Egalitarianism Reversed, Val_ST – Self-

Transcendence values, Val_T – Tradition values, Val_SE – Self-Enhancement Values, Val_O – Openness values, NEP –

environmental concern, PE – personal efficacy, CE – collective efficacy, AC – awareness of consequences, PO – personal obligation, Norm_INJ – injunctive norms, Norm_DESC – descriptive norms, Norm_MO – moral norms, I_Int – individual intention, I_Beh – individual behaviour, P_Int – public intention, P_Beh – public behaviour, C_Int – collective intention, C_Beh – collective behaviour.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Examination of the correlation matrix suggests that independent and interdependent self-construals were not correlated with one another, but both were significantly related to metapersonal self-construal. This suggested that the three would not form an underlying latent factor of self-construal in the model as was hypothesized in the measurement model, which means that the hypothesized latent construct of Self-Concept would also have to be altered. The four subscales of the Social dominance orientation scale (with all subscales coded for egalitarianism) had very high correlations among themselves as expected, but were not correlated with self-construals. Social value subscales had significant correlations among themselves, as well as with social dominance orientation and the three self-construals. As expected, injunctive and descriptive norms were highly correlated with each other, but only moderately correlated with moral norms; in fact moral norms appeared to be more strongly correlated with indicators of Beliefs. The two social norms (injunctive and descriptive) were not correlated with independent self-construal, but were related to interdependent and metapersonal self-construals. Norms were also not correlated with three of the four social dominance orientation subscales, but were significantly correlated with social values subscales. Values and norms correlated moderately with belief indicators of environmental concern, personal efficacy, collective efficacy, awareness of consequences, and perceived obligation to act. The five beliefs were strongly correlated with one another as expected. All beliefs correlate with outcome variables. Social dominance orientation, self-construals, and social norms were correlated with outcomes; however, only some social values were related, with traditionalism not correlated with any outcomes and self-enhancement negatively correlated to public outcomes only. The

patterns of observed correlations between variables suggest that some modification of the

Self-Concept latent factor was required: the independent self-construal and values of

tradition, openness, and self-enhancement may not be relevant to predicting beliefs or

pro-environmental behaviour. It would be possible to test the rest of the measurement

model as predicted.

Confirmatory Factor Analysis

The measurement component of the model was analyzed to determine whether the

proposed model fit the data. Hypotheses 1 a-d proposed that a combination of Self-

Concept factors that includes Power Distance, Self-Construal, and Values would be better

at predicting Beliefs than any one of those constructs alone. Table 6 shows the fit

statistics comparing different measurement models. A seven-factor model (model A)

with Self-Concept as second-order latent variable that includes Power Distance, Self-

Construals, and Values did not converge. Second-order factor of Self-Concept was

eliminated with six latent factors remaining. Modification indices indicated that the

Values and Self-Construal latent variables had poor factor loadings. Only metapersonal

self-construal, self-transcendence values, and the latent factor of Egalitarianism (SDO)

highly correlated with other variables in the model. The model was modified to retain 4

latent factors (Egalitarianism, Social Norms, Beliefs, Pro-Environmental Behaviours)

plus metapersonal self-construal and self-transcendence values as predictors, which

significantly improved model fit. Moral norms were found to have very low loading on

Social Norms factor and examination of the residuals suggested that moral norms were

highly correlated with Beliefs or outcome variables. Removing moral norms as an

indicator for Social Norm latent factor improved the fit of the model, however adding it

as an indicator to Beliefs or outcomes decreased the fit of the model, thus it was removed from the model.

Hypotheses 1a-d were partially supported: A four-factor *CFA* model was retained with Egalitarianism latent factor as well as metapersonal self-construal and self-transcendence values retained in the model. Although Egalitarianism, Values, and Self-Construal did not form a second-order latent factor of Self-Concept, a model with a combination of variables from all three factors (namely Egalitarianism, metapersonal self-construal, and self-transcendence values) was better fit than any of the above variables alone. Table 7 reports the estimates of pattern coefficients and error variances for the retained *CFA* model. Estimates of factor variances and covariances and of the error covariances for the final *CFA* measurement model are listed in Table 7.

Table 6

Values of Selected Fit Statistics for CFA of Social Model of Environmental Action

Measurement model	$X^2_M(df)$	p	RMSEA (90% CI)	CFI	SRMR
One factor (base model)	2415.57 (209)	.001	.160 (.155-.165)	.552	.126
Six factor	1444.30 (194)	.001	.125 (.119 - .130)	.748	.126
Four factor + Meta + Val_ST	818.180 (91)	.001	.138 (.130-.146)	.807	.133
4 factor + Meta + Val_ST, no EMO	503.63 (91)	.001	.104 (.096-.112)	.893	.065
Four factor (Egalitarianism)	431.90 (71)	.001	.109 (.100-.119) AIC 20355.776	.897	.068
Four factor (Self transcendence)	316.49 (39)	.001	.128 (.116-.141) AIC 15747.134	.892	.063
Four Factor (Meta)	316.99 (39)	.001	.129 (.116-.141) AIC 15923.371	.885	.065
Four Factor (Collectivism)	306.27 (39)	.001	.127 (.115-.140) AIC 15740.911	.885	.065

Table 7

Maximum Likelihood Estimates of Pattern Coefficients and Residuals for Four-Factor

Measurement Model of Social Model of Environmental Action

	Pattern Coefficients				Error Variances			
	Unstandardized		Standardized		Unstandardized		Standardized	
Indicator	Est.	*SE*	Est.	*SE*	Est.	*SE*	Est.	*SE*
Egalitarianism								
SD	1	-	.721	.027	1.482	.109	.492	.039
SDR	.835	.039	.803	.024	.585	.061	.354	.039
SER	1.091	.057	.819	.020	.892	.088	.329	.033
SE	1.009	.053	.902	.015	.352	.046	.184	.026
Beliefs								
PO	1	-	.838	.017	.915	.087	.297	.028
NEP	.452	.031	.628	.030	.682	.033	.606	.038
PE	.877	.028	.804	.020	.911	.071	.353	.032
CE	.825	.037	.827	.022	.679	.077	.315	.037
AC	.894	.040	.801	.018	.964	.066	.358	.030
Social Norms								
INJ	1	-	.901	.033	.452	.148	.186	.060
DESC	.842	.055	.817	.035	.696	.123	.332	.057
Observed variables								
Meta	4.781	.051	4.232	.149	1.276	.078	1	-
Val_ST	5.701	.051	5.068	.230	1.265	.099	1	-
Pro-Environmental Behaviour								
Public	1	-	.681	.031	1.195	.092	.537	.043
Collective	.514	.038	.613	.033	.452	.053	.623	.041
Individual	1.050	.081	.809	.024	.599	.069	.344	.039

Note. SD – social dominance, SDR – social dominance reversed, SE – social

egalitarianism, SER – social egalitarianism reversed, PO – personal obligation, NEP –

environmental concern, PE – personal efficacy, CE – collective efficacy, AC – awareness

of consequences, INJ – injunctive norms, DESC – descriptive norms, Meta –

metapersonal self-construal, Val_ST – self-transcendence values.

Table 8

Maximum Likelihood Estimates of Factor Variances and Covariances and Error

Covariances for Measurement Model of Social Model of Environmental Action

Parameter	Unstandardized		Standardized	
	Est.	*SE*	Est.	*SE*
Egalitarianism (SDO)	1.527	.166	1	-
Beliefs	2.166	.163	1	-
Social Norms	1.972	.176	1	-
Environmental Beh	1.032	.139	1	-
Meta ←→ Val_ST	.588	.067	.463	.036
Meta ←→ Egalitarianism	.261	.070	.187	.050
Meta ←→ Social Norms	.587	.083	.370	.046
Meta ←→ Beliefs	.537	.093	.323	.049
Meta ←→ Env Beh	.482	.066	.420	.044
Self-Transcend ←→ Egal	.834	.089	.600	.037
Self-Transcend ←→ Norms	.575	.088	.364	.046
Self-Transcend ←→ Beliefs	1.127	.102	.680	.030
Self-Transcend ←→ Env Beh	.620	.070	.543	.033
Egalitarianism ←→ Social Norms	.267	.096	.154	.052
Egalitarianism ←→ Beliefs	1.015	.115	.558	.044
Egalitarianism ←→ Env Beh	.508	.084	.404	.045
Social Norms ←→ Beliefs	.898	.128	.434	.050
Social Norms ←→ Env Beh	.730	.089	.511	.044
Beliefs ←→ Env Beh	1.056	.105	.706	.030

Structural Model Path Analysis

The structural component of the model was analyzed based on the results from

CFA analyses. First, a just-identified model containing all possible paths (15) was

analyzed. Paths that were not significant in the just-identified model were removed and

the model was simplified to 12 paths. As per Hypothesis 2 indirect relationships

(mediation) between Pro-Environmental Behaviour and cultural variables

(Egalitarianism, self-transcendence, and metapersonal self-construal) and Social Norms

were examined by comparing models with direct paths to behaviour, and without.

Models A and C were compared as per Hypothesis 3 and an interaction term between

Self-Concept constructs and social norms was tested in Hypothesis 4. Theoretical models

that the SMEA was based on, the VBN, TPB, and SIMCA were evaluated for comparison

(Hypotheses 5 a-c). Fit indices for all models can be found in Table 9. Retained models

(A and C) can be found in Figures 7 and 8.

Table 9

Fit Indices for Structural Regression of the Social Model of Environmental Action

Structural model	$X^2_M(df)$	p	RMSEA (90% CI)	CFI	SRMR	AIC
SMEA 15 paths (base model)	503.63 (91)	.001	.104 (.096-.112)	.89	.065	22824.072
SMEA 12 paths	505.66 (93)	.001	.102 (.094-.110)	.89	.065	22818.894
SMEA model A	516.75 (95)	.001	.103 (.095-.111)	.89	.066	22829.410
SMEA model A2	458.27 (83)	.001	.104 (.095-.112)	.90	.066	21490.178
SMEA model A3	304.35 (70)	.001	.09 (.080-.099)	.93	.062	20278.796
SMEA model B	532.89 (96)	.001	.104 (.096-.112)	.89	.069	22845.257
SMEA model B2	503.41 (84)	.001	.108 (.100-.117)	.89	.076	21536.525
SMEA model C	489.42 (86)	.001	.105 (.097-.114)	.89	.072	21518.602
SMEA model C2	471.75 (85)	.001	.104 (.095-.112)	.90	.069	21500.152
SMEA model C3	316.91 (72)	.001	.09 (.080-.099)	.93	.062	20278.796
SMEA model D	503.41 (84)	.001	.108 (.100-.117)	.89	.076	21536.525
VBN	289.87 (13)	.001	.223 (.202-.244)	.84	.107	10589.345
TPB	26.24 (3)	.001	.132 (.91-.179)	.97	.031	7443.416
SIMCA	199.60 (4)	.001	.356 (.319-.314)	.43	.183	8085.252

Note. 15 Path – just identified, 12 – removed Meta→ Beliefs, Val_ST→EnvBeh,

SD→EnvBeh paths. The SMEA model A2, B2, and all versions of model C had Meta

removed. The SMEA model A3 and C3 had NEP removed. All the SMEA models had

direct path between Social Norms and Pro-Environmental Behaviour retained. The VBN

had individual and public intentions as outcome as per original theory. The TPB had

individual intentions and self-reported behaviours as outcomes as per original theory.

The SIMCA had collective intentions as outcome as per original theory and

interdependent self-construal as measure of group identification.
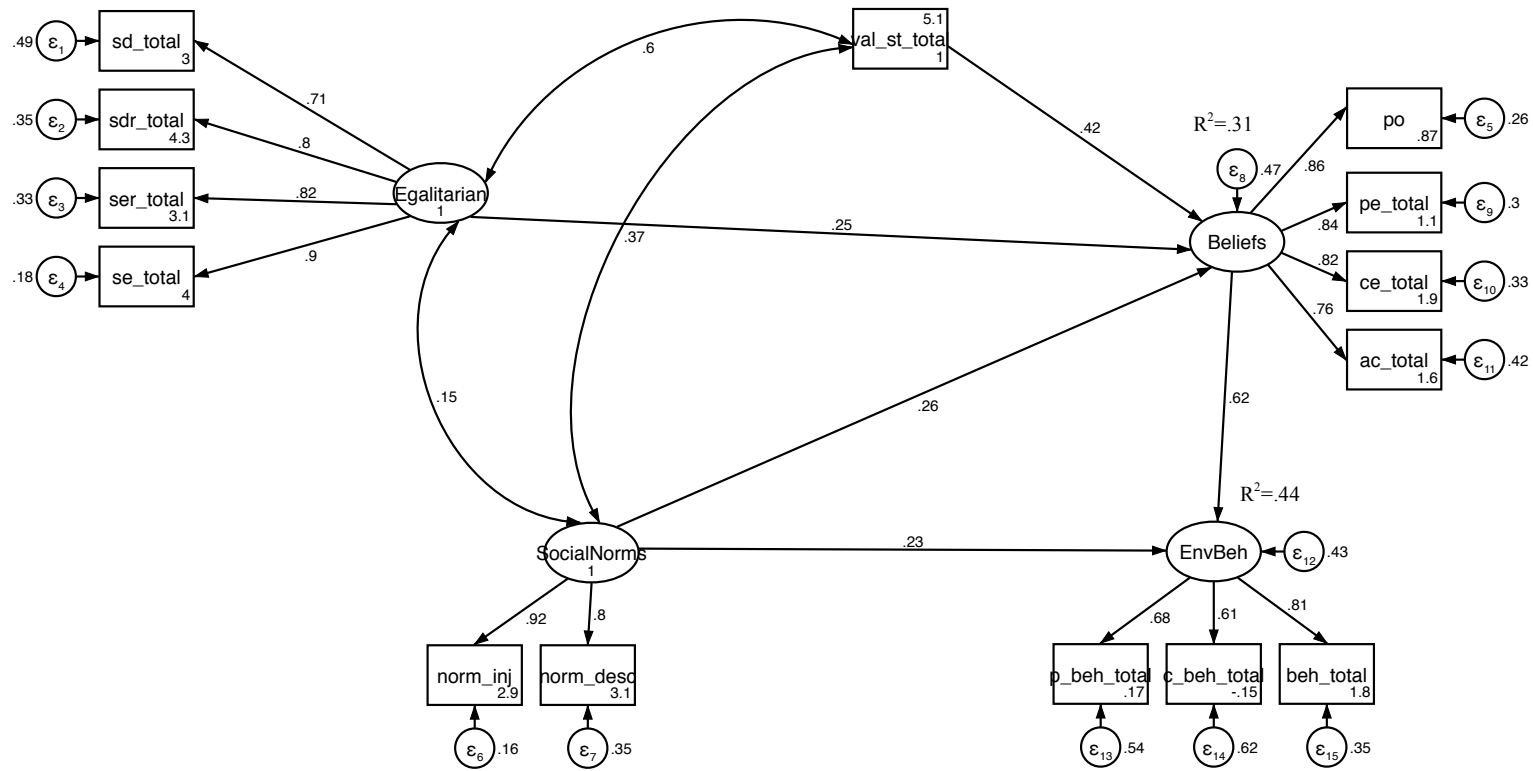
Figure 7. Structural component of the SMEA model A3 with standardized estimates
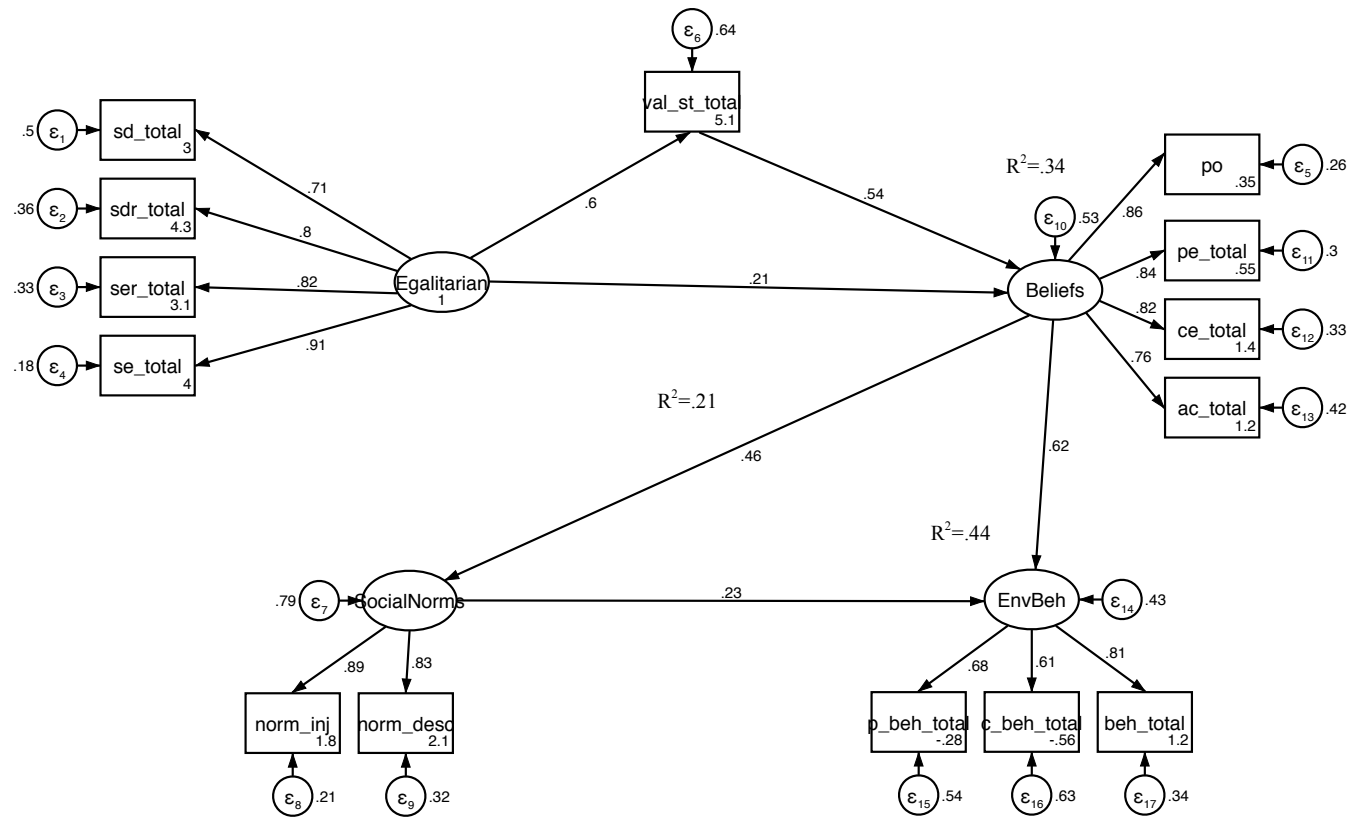
Figure 8. Structural component of the SMEA model C3 with standardized estimates

In the just-identified model, two of the three non-significant paths were between values and behaviours, and Egalitarianism and behaviours, thus supporting Hypothesis 2a, which stated that the relationship between values and outcomes was mediated by Beliefs (metapersonal self-construal was cut from the model because according to modification indices removing it would improve model fit without losing any predictive power). That is, value variables were correlated with the outcome, however when beliefs were accounted for, the direct relationship was no longer significant, suggesting that values influence self-reported behaviour via beliefs. However, according to Kline (2016), indirect effects are not true mediation unless the study is designed in a manner where that includes time precedence between causal variables, the mediator, and the outcome. Although the findings support to the hypothesis, because all variables were individual self-report it is not possible to make a conclusion that beliefs actually mediate the relationship between values and outcomes, only that the effect is indirect.

The SMEA model A did not converge without a path between Social Norms and Pro-Environmental Behaviour while model C did converge without that path but the overall fit of the model was poorer without it; thus Hypothesis 2b, which predicted that the relationship between Social Norms and Pro-Environmental Behaviour is also indirect, with Beliefs as intervening variable was rejected. Although the inclusion of Beliefs accounts for some variance between Social Norms and Behaviour, in all versions of the model tested Social Norms have a significant direct effect on outcomes ($\beta = .16$, $p < .001$). Furthermore, model C, an equivalent model that tested whether Beliefs predict perception of Social Norms rather than the reverse, had equally good fit as model A. Hypothesis 3, which predicted that model A would be a better fit for the data than model C, was not

supported. Standardized and unstandardized estimates of pattern coefficients and residuals for both models can be found in in Tables 10 and 11. Standardized and unstandardized estimates and standard error for both models can be found in Tables 12 and 13.

Table 10

Maximum Likelihood Estimates of Pattern Coefficients and Residuals for Social Model of Environmental Action Model A

| | Pattern Coefficients | | | | Error Variances | | | |
| | Unstandardized | | Standardized | | Unstandardized | | Standardized | |
Indicator	Est.	*SE*	Est.	*SE*	Est.	*SE*	Est.	*SE*
Egalitarianism								
SD	1	-	.712	.027	1.484	.110	.493	.038
SDR	.837	.039	.804	.024	.583	.062	.353	.039
SER	1.091	.058	.818	.020	.896	.090	.330	.033
SE	1.009	.053	.903	.015	.352	.047	.184	.026
Beliefs								
PO	1	-	.858	.017	.814	.088	.264	.029
PE	.893	.028	.837	.019	.771	.079	.299	.033
CE	.799	.038	.819	.022	.709	.076	.329	.036
AC	.827	.042	.759	.025	1.143	.092	.424	.037
Social Norms								
INJ	1	-	.917	.035	.384	.158	.159	.064
DESC	.814	.059	.803	.037	.743	.126	.355	.060
Observed variables								
Val_ST	5.701	.051	5.069	.233	1.265	.101	1	-
Pro-Environmental Behaviour								
Public	1	-	.682	.031	1.193	.092	.536	.043
Collective	.513	.039	.612	.034	.453	.056	.625	.042
Individual	1.049	.082	.809	.025	.600	.069	.345	.040

Table 11

Maximum Likelihood Estimates of Pattern Coefficients and Residuals for Social Model of

Environmental Action Model C

	Pattern Coefficients				Error Variances			
	Unstandardized		Standardized		Unstandardized		Standardized	
Indicator	Est.	*SE*	Est.	*SE*	Est.	*SE*	Est.	*SE*
Egalitarianism								
SD	1	-	.710	.027	1.491	.109	.495	.038
SDR	.837	.039	.803	.025	.588	.062	.356	.040
SER	1.091	.056	.817	.021	.903	.090	.333	.034
SE	1.016	.052	.906	.014	.341	.047	.179	.026
Beliefs								
PO	1	-	.857	.017	.816	.088	.265	.029
PE	.894	.028	.838	.019	.769	.079	.298	.032
CE	.798	.038	.818	.022	.712	.076	.330	.036
AC	.827	.042	.758	.025	1.144	.092	.425	.037
Social Norms								
INJ	1	-	.891	.038	.501	.167	.206	.068
DESC	.863	.066	.827	.037	.661	.130	.315	.061
Observed variables								
Val_ST	5.701	.051	5.069	.232	.808	.059	.639	.044
Pro-Environmental Behaviour								
Public	1	-	.681	.031	1.196	.092	.537	.043
Collective	.513	.039	.612	.034	.453	.056	.625	.042
Individual	1.051	.082	.810	.025	.598	.069	.344	.040

Table 12

Maximum Likelihood Satorra-Bentler Corrected Estimates for the Structural Component

of the SMEA Model A

Parameter	Unstandardized	*SE*	Standardized
	Direct Effects		
Val_ST → Beliefs	.567	.067	.423
Egalitarian → Beliefs	.298	.065	.245
Social Norms → Beliefs	.271	.052	.257
Belief → Env Beh	.419	.041	.620
Social Norms → Env Beh	.163	.037	.229
	Covariance Effects		
Val_ST ←→ Egalitarian	.833	.090	.600
Val_ST ←→ Social Norms	.587	.090	.366
Egalitarian ←→ Social Norms	.269	.098	.152

Table 13

Maximum Likelihood Satorra-Bentler Corrected Estimates for the Structural Component

of the SMEA Model C

Parameter	Unstandardized	*SE*	Standardized
	Direct Effects		
Egalitarian → Val_ST	.548	.054	.600
Val_ST → Beliefs	.727	.063	.540
Egalitarian → Beliefs	.253	.067	.210
Beliefs → Social Norms	.425	.050	.460
Belief → Env Beh	.418	.041	.620
Social Norms → Env Beh	.167	.039	.230

Both models A and C had better global fit than model D, which tested an interaction between Social Norms and culture variables. As the culture variables did not form a unifying factor of Self-Concept and self-construal indicators were not retained in the model the interaction term was made for Egalitarianism x Social Norms. Model D was compared with models A and C. A model with a path from the interaction term to Pro-Environmental Behaviour did not converge; the only version of the model D that successfully converged retained a direct path from social norms to Pro-Environmental Behaviour, and interaction term to Beliefs. The path coefficient for (Egalitarianism x Social Norms) → Beliefs (H4b) was β=1.70, p<.001 (unstandardized), and together with self-transcendence values (β=.61, p<.001) accounted for 65% of Beliefs (which is better than models A and C) but Beliefs and Social Norms predicted the same amount of variance of Pro-Environmental Behaviour in all three models. Thus, Hypothesis 4a, which stated that the interaction would moderate the influence of norms on self-reported pro-environmental behaviour, was not supported; but Hypothesis 4b, which stated that the interaction moderated the influence of Norms on Beliefs, was supported. Overall however, model D had poorer global fit than models A and C.

The SMEA models (A and C) had better overall fit than VBN model and explained more variance, supporting Hypothesis 5a. In the VBN model, self-transcendence values accounted for 47.6% of Beliefs, which in turn predicted personal obligation 69% of the time. Personal obligation accounted for 59% of individual and public intention to act. For comparison, in the SMEA model Egalitarianism, self-transcendence and Social Norms predicted 31.5% of variance in Beliefs, and Beliefs and Social Norms together accounted for 64% of individual, public, and collective intention

to act in pro-environmental ways (or 44% of self-reported behaviours). Hypothesis 5b

was also supported: Although the TPB had excellent fit on *CFI* and *SRMR* indices, it had

poor fit on *RMSEA* and accounted for 33.8% of individual intentions to act. Lastly,

SIMCA had comparatively poor fit to the SMEA and accounted for only 17.3% of

variance of collective intention to act, thus supporting Hypothesis 5c. A summary table

of hypotheses can be found in Table 14.

Table 14

Summary Results of Hypothesis Testing

Hypotheses	Results
H1a-d: The latent factor of Self-Concept would account for more variance in Pro-Environmental Behaviours than (a) Self-Construal alone, or (b) Values alone, or (c) Egalitarianism alone, or (d) group identification (collectivism) alone	Partially supported
H2a: Self-Concept (Self-Construal, Values, Egalitarianism) would affect Pro-Environmental Behaviours indirectly via Beliefs (personal and collective efficacy, awareness of consequences, personal obligation, and environmental concern)	Supported
H2b: Social Norms (injunctive, descriptive, and moral) would affect Pro-Environmental Behaviours indirectly via Beliefs	Not supported
H3: Model A (Self-Concept and Norms as exogenous) would have better fit than model C (only Self-Concept is exogenous, see Appendix A)	Not supported
H4a: The effect of Social Norms on Pro-Environmental Behaviours would be moderated by Self-Concept	Not supported
H4b: The effect of Norms on Beliefs would be moderated by Self-Concept	Partially supported
H5a: The proposed model would account for more variance in Pro-Environmental Behaviours than the VBN model	Supported
H5b: The proposed model would account for more variance in Pro-Environmental Behaviours than the TPB model	Supported
H5c: The proposed model would account for more variance in Pro-Environmental Behaviours than the SIMCA model	Supported

CHAPTER VI

Discussion

The present study proposed a social model of environmental action (SMEA) that explains a variety of types of pro-environmental behaviour ranging from individual to collective. Addressing climate change is a complex problem that requires a multifaceted response with coordination between individuals within and across communities and in different cultures. The model helps to explain the motivations for individual environmental actions as well as those that aim to change institutions that dictate cultural values and social norms. The model contributes to the literature on environmental action by furthering understanding of the mechanics of the global environmental movement.

The SMEA combined previous models: the value-beliefs-norms, the theory of planned behaviour, and the social identity model of collective action, by proposing that self-concept and social norms predict efficacy beliefs that lead to pro-environmental behaviour. Overall the SMEA had adequate model fit and explained more variance than the three other models, although the results do not support the proposed relationships between variables in the self-concept construct. Key values of egalitarianism and self-transcendence as well as social norms were found to predict efficacy and responsibility beliefs that predicted self-reported environmental action. Social norms were also found to predict self-reported behaviour over and above efficacy beliefs.

Previous studies found that the VBN and the TPB failed to account for collective behaviour (Fielding, McDonald, & Louis, 2008; Stern, 1999). The SIMCA, the model that predicts collective action, was developed in isolation from the literature on individual pro-environmental behaviour. It also has certain limitations in that it presupposes being a

member of an environmental group but does not provide antecedents to joining such a

group. In order to bring these literatures together, the SMEA defined climate change as a

collective action problem and incorporated the collective perspective throughout the

model. This is because in order to work effectively with others, individuals must first

understand that the problem is social and that collective effort is required (Stern, 1999).

Stern goes on to say:

> It implies acceptance of a definition of environmental problems as social,
> requiring collective action and change by government, industry, and other social
> institutions; and it is a more promising course of action for individuals who have
> the status, access, and human capital resources to be effective influence agents in
> large organizations or the political system. The evidence shows that
> environmental citizenship is in fact differentially a function of variables that
> reflect a social definition of environmental problems and of individuals' access to
> resources for social influence (p. 90).

Here Stern suggests that the definition of the problem must be collective and that

a combination of individual and contextual variables would influence those who are fairly

high within the social hierarchy to fight for equality of those lower on the hierarchy. The

present study attempted to address these relevant variables using a combination of values

that define the self in relation to others in a way that promotes efficacy beliefs in

individual and collective pro-environmental behaviour.

Self-Concept

It was proposed that pro-environmental behaviours would be influenced by a

combination of values that defined the self in relation to others in society. These values

included orientation toward equality (i.e., low social dominance or high egalitarianism),

social values, and a construal of self that is both highly independent and interdependent

and extends concern beyond the self and beyond one's social group (metapersonal). The

findings of the present study suggest that self-transcendence values and preference for

equality play an important role in predicting pro-environmental behaviour, including

collective action. In line with other studies, self-transcendence was indirectly related to

pro-environmental behaviours via beliefs of personal obligation and individual and

collective efficacy. It is argued that self-transcendence values are individual-level values,

while egalitarianism is considered to be a relational value shared by the group (Fiske,

2002; Koerner, 2006), suggesting both individual and group-based beliefs are required in

order to understand efficacy beliefs and the full range of pro-environmental behaviours.

Other values, including self-enhancement, tradition, and openness were not found

to be related to beliefs or self-reported behaviours in the present study. In the literature

there appears to be some variation in which values predict behaviours among different

cultures: for example, Milfont, Duckitt, and Cameron (2006) found that for European

New Zealanders only biospheric values (a subset of self-transcendence) predicted pro-

environmental behaviour, whereas for Asian New Zealanders both self-transcendence and

self-enhancement predicted behaviour. In Sweden (Jansson, et al., 2011), Norway (Lind

et al., 2015) and the Netherlands (Steg et al., 2005), self-enhancement and self-

transcendence predicted environmental concern whereas only self-transcendence was

related to behaviour. There could be a number of reasons why in the present sample the

negative relationship between self-enhancement and environmental concern was not

evident, for example, environmental concern and self-enhancement could have a positive

relationship for some people because there may be status associated with being "green."

However, since in the present study environmental concern did not contribute to

explaining additional variance above and beyond responsibility and efficacy beliefs, self-

enhancement may not be relevant in the US because those who claim to be concerned

about the environment for self-enhancing reasons do not actually act on their professed beliefs. Although some studies have found that traditional values were related to environmental concern (Schultz & Zelezny, 1999), many such as Stern have found no link with pro-environmental behaviour or intention.

In line with previous research, the present study also found that low power distance (high egalitarianism) was a significant predictor of efficacy beliefs and self-reported pro-environmental behaviour. The literature often frames a desire to dominate other groups leading to the desire to dominate nature for material gain and promoting climate change denial. As Feygina (2013) argues, the violation of human rights is embedded in environmental degradation – it is the same mindset that leads people to treat both other groups and the environment disrespectfully. The present study, however, is in line with studies that show the reverse is also true – the endorsement of equality and egalitarianism in society is a significant predictor of pro-environmental beliefs and self-reported behaviours. Kahan, Jenkins-Smith, and Braman (2011) found that the majority of those who value egalitarianism believed in the scientific consensus around climate change. Kasser (2011) found that higher egalitarianism was associated with higher concern for future generations and lower national-level emissions. Egalitarianism and equality values may promote environmentalism because valuing egalitarianism reduces system justification (Jylha & Arkami, 2015), and promotes more liberal and less authoritarian society (Patchen, 2010). Price and others (2014) also suggest that the egalitarian view reflects the beliefs that there is a balance of nature and limits to human growth, and that egalitarians view both individual agency and group action on the environment as a way to protect the group.

Stern (1999), on the other hand found that egalitarian participants were less likely to engage in in environmental citizenship behaviours (collective action). This contradiction may stem from the nature of egalitarianism as a relational approach – according to Fiske, egalitarianism is part of a relational approach he terms *equality matching*, which means individuals focus on equality with others but its nature can be "tit-for-tat" where imbalance is extremely salient (Koerner, 2006). If people perceive their relationship with others in society in this way, they may not be motivated to participate in collective action unless they perceive that others are pulling their weight. Related to this, some researchers argue that one way to leverage the "tit-for-tat" mindset is to structure incentives so that even though individuals cannot be excluded from using public goods such as the environment, they can be excluded from incentives that others get if they do not participate in collective action (Trumbull, 2012). This would explain why the same finding did not emerge in the present study, as perception of others' behaviour was taken into account in the SMEA.

Egalitarianism is not typically part of the VNB, TPB, or SIMCA models, and how it relates to other values, such as self-transcendence is still unclear. In the present study, it was hypothesized that it would be part of the individual's self-concept. This hypothesis was not supported, and the two equivalent models that emerged propose different relationships between self-transcendence and egalitarianism. In model A, the two are correlated whereas in model C, egalitarianism predicts self-transcendence values. However, it is impossible to tell using a correlational research design which of the two models is correct. In order to further investigate this relationship, future research would have to include time precedence of one of the variables to test for causation.

Power distance (egalitarianism) influences environmental attitudes and behaviours on multiple levels, however. Research suggests that it takes those who are relatively high within the social hierarchy to perceive unfairness and to take action (Saeri, Iyer, & Louis, 2015; Stern 1999). Those with a low position within the hierarchy are more likely to accept inequality as something they cannot change. In a similar vein, Takahashi, Tandor, Jr., Duan, and Van Witsen (2017) found that environmental concern (belief) is more likely to predict pro-environmental behaviour in countries that already have a healthier environment (these countries tend to be wealthier and more powerful and relatively more egalitarian). In the present sample, the average income was below average of a typical American and there were few participants who were highly active at the public and collective level. This is a reminder that power distance interacts at both at the individual and societal level, and future research should examine power distance at multiple levels of analysis simultaneously.

The present study also examined whether self-construals predicted self-reported pro-environmental behaviour. Of the three self-construals, metapersonal self-construal was the only significant predictor; however, its inclusion in the model did not explain any additional variance over and above other factors in the model, and the overall fit of the model was significantly improved without it. Metapersonal self-construal was correlated with egalitarianism and self-transcendence values, suggesting perhaps that the overlap in constructs that relates to pro-environmental outcomes is already accounted for by the other two variables. Future research should examine the discriminant validity of these measures to see the extent of conceptual overlap and whether metapersonal self-construal accounts for any unique variance in pro-environmental behaviour. Although

metapersonal self-construal was the weakest predictor of the three self-concept variables (egalitarianism, social values, and self-construal), unlike the other two self-concept variables it was related directly to self-reported behaviours and not efficacy beliefs whereas other value and self-construal variables were mediated via beliefs. Although it was not retained as a predictor because it did not improve the overall fit of the model, metapersonal self-construal warrants further exploration. Future research should focus on activating the metapersonal self-construal to examine whether it can predict changes in pro-environmental behaviours, especially collective behaviour, and whether it can lead to successful social interventions.

Neither independent nor interdependent self-construals were related to efficacy beliefs or self-reported pro-environmental behaviour, though it was possible the effect of interdependent self-construal was masked by heteroscedascticity. These findings are in line with Iwaki (2011) who found that in the presence of other variables such as self-efficacy, knowledge, and egalitarianism self-construals did not predict individual behaviour. Likewise, an analysis of World Values Survey data found that independent self-construal did not influence the relationship between beliefs and behaviours nor was associated significantly with either of these variables, though the interdependent self-construal was associated with pro-environmental behavioural intention (Eom, Kim, Sherman, & Ishii, 2016).

The present study proposed that those who were high on both independent and interdependent self-construal were most likely report engaging in pro-environmental action. Previous research suggested that construals are dynamic, and individuals who are high on both independent self-construal and interdependent self-construal tend to curtail

self-serving behaviours in order to consider the needs of others as well as acting in their own self-interest (Koustova, Kwantes, & Kuo, *submitted*). However, although the two dimensions are orthogonal, they were not highly correlated; that is, they did not form an underlying factor of self-construal as conceptualized in the model, making this construct ill-equipped to measure a balance between individual agency and concern for the collective that is needed in order to go against societal norms that perpetuate environmentally destructive behaviour.

The weak results in regards to the two traditional conceptualizations of self-construal can perhaps be attributed to the level of analysis. The literature suggests there may be differences at the cultural level, as social structures in individualist versus collectivist cultures encourage certain kinds of behaviours and limit what kinds of behaviour is possible and effective (Markle, 2014). Eom and colleagues (2016) found a correlation between country-level individualism and individual pro-environmental behaviour intention (but not environmental concern). This suggests that people in individualist cultures are no more likely to care about environmental problems than those in collectivist cultures, but if they do care they are more likely to intend to act via personal behaviour and policy support, than collective action. Individualism and collectivism as group level variables may be more useful as contextual explanatory variables than the individual level independent and interdependent self-construals. Further research is needed that explores the constructs at multiple levels of analysis.

Beliefs

The SMEA model tested whether efficacy and obligation beliefs act as an intervening variable between values, norms, and self-reported pro-environmental

behaviour. The latent factor of beliefs included indicators of individual and collective

efficacy (also known as locus of control, which has been shown to predict pro-

environmental behaviour; Newman & Fernandes, 2016), awareness of consequences, and

perceived obligation to act. The present model hypothesized a construct of beliefs that

included environmental concern; however, it was not found to predict any variance in

self-reported behaviour over and above awareness of consequences, personal obligation,

and efficacy. This may be because, as shown by the World Values Survey data, there are

significant variations between cultures on the correlation between environmental concern

and pro-environmental intentions and behaviours (Eom et al., 2016). Reviews by Gifford

and Nilsson (2014) and Newman and Fernandes (2016) also suggest that some

demographics (i.e., young, educated, and liberal) are related to higher pro-environmental

concern in general, but whether that concern translates into behaviour is mediated by a

host of other factors, such as race, SES, education, and income. The present study

suggests that if an individual believes that s/he must act and that his or her actions will be

effective at achieving change, s/he is more likely to follow through on environmental

concern.

Social Norms

The SMEA model also incorporated social norms as a predictor of efficacy beliefs

and self-reported pro-environmental behaviour. Unlike the VBN and the TPB, the

SMEA proposed that social norms are an external social variable, as opposed to an

internal belief variable, arguing that social pressure to behave in a pro-environmental way

is external to the individual and would affect a wider range of behaviours. The model

hypothesized that, similar to values, the influence of norms on behaviour might be

indirect through efficacy beliefs, because being in individualist culture it is common for individuals to deny the influence of social norms on their behaviour (Cialdini, 2007).

The results were in line with the literature that found social norms are significant predictors of self-reported pro-environmental behaviour, although the conflict between whether norms are a social factor or an internal perception remains unresolved. In the present study, it was found that beliefs accounted for some of the relationship between norms and self-reported behaviour, but that norms had an additional direct influence on behaviour, over and above that of beliefs. This suggests that sometimes people report that they act pro-environmentally not because they believe they must or that it will make a significant difference, but because everyone else is doing it and expects it of them as well. In fact, Eom and colleagues (2016) suggest that in more collectivist cultures social norms are more likely to influence intention to act pro-environmentally rather than individual attitudes. This also suggests that the inclusion of individual values and beliefs, as well as social norms may make the present model more robust at predicting self-reported behaviour across cultures.

The present model could not distinguish whether social norms predicted beliefs or vice versa, although the directional relationship for beliefs predicting norms was slightly stronger than the reverse. That is to say, it is possible that individuals who believe it is their responsibility to act may perceive social pressure to do so, or those who feel social pressure may believe it is their responsibility to act. The two variations of the model are statistically equivalent, and the present study was unable to distinguish between them. It is also possible that the influence is non-recursive, or goes in both directions – for some individuals the social pressure comes first, and for others a sense of responsibility and

efficacy makes them seek out others who embrace the same norms. Future studies should investigate this relationship by manipulating social norms experimentally, rather than relying on self-report of individual's perceptions of norms. The limitation of *SEM* when it comes to equivalent models is discussed further in the limitations section.

The present study also explored the addition of moral norms to the construct of social norms. The construct of moral norms was defined as group-based "guilty conscience" (Rees & Bamberg, 2014), and although it was highly correlated with various beliefs and outcomes, it did not fit in with the factor of social norms as predicted and did not improve the overall fit of the model or account for additional variance. Recent research suggests that the link between guilt and pro-environmental behaviour is inconsistent. For example, Bissing-Olson, Fielding, and Iyer (2016) found that pride in performing behaviour that people thought was morally valued by others was more likely to produce subsequent pro-environmental behaviour than guilt. Their research suggests that people who perform pro-environmental behaviours feel less guilt, but that guilt does not motivate behaviour. Research also suggests that when individuals feel guilty they tend to engage in comparative reasoning to alleviate guilt, rather than changing their behaviour (Bedford et al., 2011). Finally, research suggests that moral appeals differ for liberals and conservatives, in that moral appeals must be tailored to conservatives in terms of obedience to authority, defending purity, and patriotism (Wolsko, Ariceaga, & Seiden, 2016) rather than being about shame and future generations.

Theoretical implications

The strength of the present study is the development and validation of a model that has its focus on the full spectrum of individual, public, and collective pro-

environmental behaviour, as well as being thoroughly grounded in theory, combining major competing theories in a parsimonious way. The SMEA accounts for more variance in self-reported pro-environmental behaviour and intentions and expands the repertoire of what is considered such behaviour. Farrer (2016) suggests that individuals have choice in terms of how to act and report the kinds of behaviours they think are instrumentally valid – that is, individuals will not perform all behaviours all the time, and will pick and choose those they perceive to be most effective in a given situation. This suggests an unexplored area of study in terms of what kind of pro-environmental behaviours individuals and groups engage in, what criteria they use for judging what is worth the investment of time and energy, and highlights the fact that beliefs about efficacy influence intentions to participate in different kinds of behaviour.

This model also has implications for cross-cultural studies of pro-environmental behaviour. Typically, studies look at individual-level behaviours such as purchasing green products and find differences between cultures in terms of predictors of such behaviour (e.g., Eom et al., 2016). However, it is entirely possible that people in other cultures simply do not see actions such as green consumerism as an effective pro-environmental behaviour, or perhaps within their culture or physical environment the behaviour is simply not feasible. For example, food in Japan must be packaged in layers of plastic because otherwise extreme heat and humidity will make it spoil very quickly. This unsustainable behaviour comes out of necessity due to their physical environment, and they try to attenuate for its effects by having an extremely comprehensive recycling program. When studies compare Japanese and American participants, they find that both recycle, but if the behaviour under investigation were to advocate for the reduction of

plastic packaging, Japanese participants may appear to be uninterested in plastic pollution. Studying a broad spectrum of pro-environmental behaviours within relevant contexts will allow for better understanding of the fundamental motivations for pro-environmental action, rather than studying the determinants of very specific behaviours that may not be applicable or appropriate in different physical, social, and cultural contexts.

This model also has implications for how the problem of climate change is framed. The issue with framing climate change as a problem for the individual to solve, is that the individual is more likely to think about scarcity and taking care of their own needs above others leading to the "tragedy of the commons." Furthermore, the individual will rely on personal values and beliefs that may or may not lead them to individual action (depending on how futile they think it is). However, when climate change is conceptualized as a collective action problem, individuals are forced to think of collective solutions. A theory that accounts for the kinds of values, beliefs, and norms that make it possible to frame the problem in this way can help research move in the direction of a paradigm shift needed to transform society.

Practical Implications

The practical value of this study is to help practitioners and citizens trying to develop community interventions and social marketing campaigns in order to not just target individual behaviour change, but also encourage citizens to seek collective strategies for change (Bamberg et al., 2015). Consensus is growing among researchers that climate action will require systemic transformation; rather than making incremental or individual changes, citizens will have to be involved in climate governance (Tosun &

Schoenefeld, 2017). Particularly in the current political climate, individuals in the United

States may feel that individual pro-environmental behaviours are futile in the face of the

new administration's focus on environmental deregulation and pro-fossil fuel agenda

(Roberts, 2017). However, at the international level the call for collective action is

increasingly loud, and those who want to be engaged need the tools to contribute. One

recommendation stemming from this research is that interventions should frame climate

change as a collective problem to encourage people to become engaged in collective

action. If people focus their efforts on collective action such as engaging with their city

officials, NGOs, and community organizations, they can adequately address all three

governance functions needed in order to address the climate problem in a decentralized

network manner (Tosun, & Schoenefeld, 2017) that circumvents federal government.

This research also has implications for how individuals will react to knowledge

raising and motivational campaigns. For example, moral appeals focused on guilt about

leaving the problem for future generations will not be effective, especially for groups

who are conservative and hierarchical (Wolsko, et al., 2016). However, for those who

are egalitarian, campaigns that focus on a sense of responsibility and efficacy should be

effective. Having a clear idea of the target population for social campaigns and what

their values and beliefs are will allow for more strategic targeting of messages that will

resonate with the group and be more effective. The theory (which has so far only been

tested in the United States) also suggests that educators in the United States should

promote the development of egalitarian and self-transcendence values if they want their

students to feel as though they are responsible for creating effective societal change.

In fact, the importance of efficacy beliefs in predicting whether individuals join in collective and individual action has practical implications. In order to empower individuals to take action, interventions have to focus on increasing perceptions of efficacy by teaching citizenship action skills and encouraging community involvement (Newman & Fernandes, 2016). Furthermore, highlighting how local grassroots efforts are connected in a network across the globe may increase perceptions of collective efficacy of the pro-environmental movement and draw more people to participate (Tosun, & Schoenefeld, 2017).

Climate action is already taking place in a decentralized network of individual and collective effort (Tosun, & Schoenefeld, 2017). Examples of current collective actions are abundant. For example, there are transnational networks between community groups and cities, such as Energy Cities, Climate Action Network, and the European Federation for Groups and Cooperatives of Citizens for Renewable Energy and Energy Efficiency (REScoop.eu). There are projects documenting individual and community stories of how climate change is affecting them and how they are taking action, such as Climate Stories (http://www.climatestoriesproject.org/). There are also grassroots campaigns encouraging fossil fuel divestment, which encourages individuals to close their bank accounts at banks that fund pipelines, such as 350.org (with dozens of chapters across the globe), fossilfree.org, Fossil Free Canada, and others. These campaigns build coalitions to put pressure on higher education institutions and governments to divest millions of dollars from fossil fuel projects like the North Dakota pipeline and the Alberta tarsands. Finally, protests such as the North Dakota #NoDAPL movement that drew supporters from around the world, and the People's Climate March which drew over 200,000

protesters to Washington DC and 375 sister marches around the world (Mooney, 2017),

are just a few examples of the countless actions being taken by citizens. Studying

effective network coordination and cooperation will also help improve communication

between communities and sharing of ideas and support.

Limitations and Future Directions

In line with other studies in the literature, the present study measured self-

reported collective pro-environmental behaviours as political collective action. However,

there are other types of collective action that citizens may be involved in that are not

inherently political, such as neighbourhood-based environment protection initiatives.

According to Tosun and Schoenefeld (2017), such community interventions are arguably

more effective because they promote social learning that change attitudes and behaviour

of people within communities, and promote policy changes that can help institutionalize

climate change initiative efforts. As a group with community-based institutions

advocating on their behalf, communities have more leverage in the political arena. A

community-based understanding of collective action would help improve understanding

of how individuals engage when they are not comfortable with participating in political

activity. Especially since certain groups are less likely to take part in political collective

action because of their place in the social hierarchy, such as for example young women

who are less likely to attend a protest, but more likely to participate in behaviours such as

blogging (Keller, 2012). In addition, there is an inherent limitation in measuring pro-

environmental behaviour using self-report measures, as they are not as reliable as

measuring actual observed behaviour for a variety of reasons including poor memory and

social desirability (Kormos & Gifford, 2014).

The applicability of the present model to different samples, including political, gender, and cultural groups is yet to be verified. The data do suggest that those who have higher knowledge of climate change causes are more likely to take action and that women are more likely to act pro-environmentally (although only at the individual and public level, while men are more likely to act at the collective level). However, the present study did not so much focus on whether individuals believe or do not believe in climate change, which may be influenced by political affiliation (Hornsey, Harris, Bain, & Fielding, 2016) but instead focused on why some people act on their knowledge and others do not. Research also suggests that differences between genders in pro-environmental behaviour are partially mediated by social dominance orientation – that is, women tend to be more egalitarian and empathetic, while men tend to be more hierarchical and less empathetic (Milfont & Sibley, 2016). Thus, including egalitarianism in the model attenuates some gender differences, suggesting that the model could be a good fit in terms of predictive ability for both genders, although further research is needed.

There are some limitations with recruited samples from Amazon Mechanical Turk. Recent research suggests that because the platform has been around for several years, the participants are not as "naïve" as desired, and that the platform is full of "professional survey takers," which may potentially reduce effect sizes found in studies on AMT (Peer, Brandimarte, Samat, & Acquisti, 2017). Additionally, while AMT claims to have over five hundred thousand participants, some researchers suggest there are as few as 7000 active users (Stewart, Ungemach, Harris, Bartels, Newell, Paolacci, &

Chandler, 2015). Despite the limitations of the platform, the present study had excellent

variability in age, gender, and political affiliation, with strong effect sizes.

Finally, an important limitation with *SEM* methodology is the problem of

equivalent models. Although the present model is based on sound theoretical

background, the vast literature suggests many different variables at play and different

groups of researchers suggest different types of relationships between variables.

Although the present model has good fit, it is possible that another configuration of the

same variables could have equal or better fit using the same sample data, as illustrated by

the equivalent models found in the present study. The methodology does not provide any

inherent insight into the true relationships between variables; model A and model C make

different assumptions about the relationship between social dominance and self-

transcendence, values and social norms, as well as beliefs and social norms. While there

is little empirical background to argue that egalitarianism predicts self-transcendence

values, one can argue that social norms are outside the individual, and could predict

beliefs as opposed to vice-versa. However, since all measures are self-report, it is unclear

whether the social norms for participants are a reflection of their actual social

environment, or whether the social pressure is perceived based on certain beliefs about

responsibility to take action. Further research that can disentangle the relationship

between social norms and beliefs is needed in order to validate one of the models over the

other. Likewise, there may be other variations of the model that may be valid that may

include some of the indicators that were ultimately left out of the present model.

Conclusion

The aim of the present study was to develop a comprehensive model of pro-environmental behaviour that brings together several related threads of research. Based on strong theoretical background, the social model of environmental action brings together individual and group values, beliefs, and norms to predict self-reported behaviour. It also highlights the need to broadly define and measure pro-environmental behaviours, which are highly contextual. Climate change is too complex and too urgent to be reduced to token actions of green consumerism, and this research aims to help address gaps in action by broadening the understanding of what climate action entails and the motivations that draw people to the cause. The SMEA model helps build understanding of a multifaceted and global movement that aims to transform the global social system, as we know it.

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APPENDIX A: Proposed Models
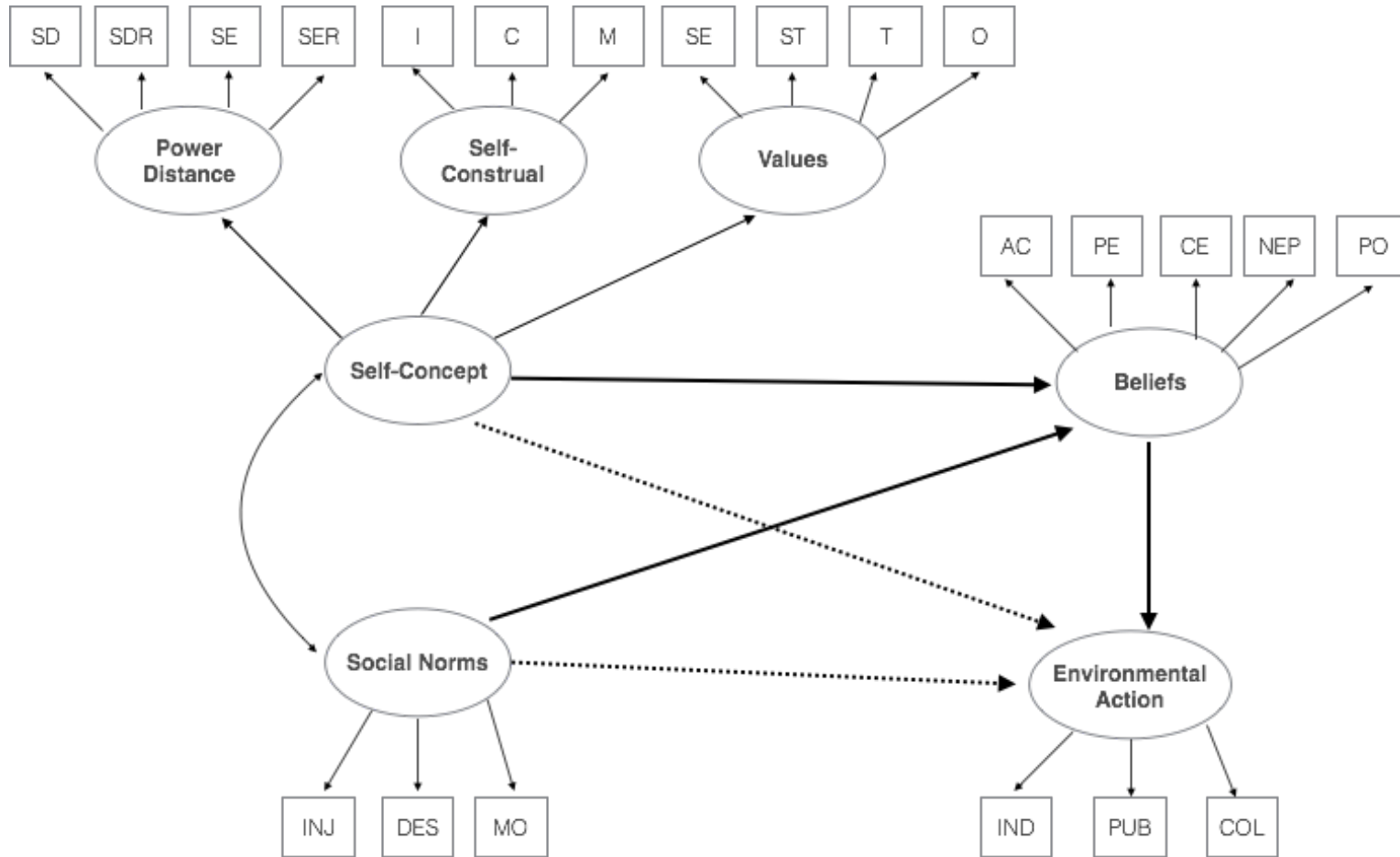
Figure 9. Proposed Model: Social Model of Environmental Action (SMEA)

MODEL B
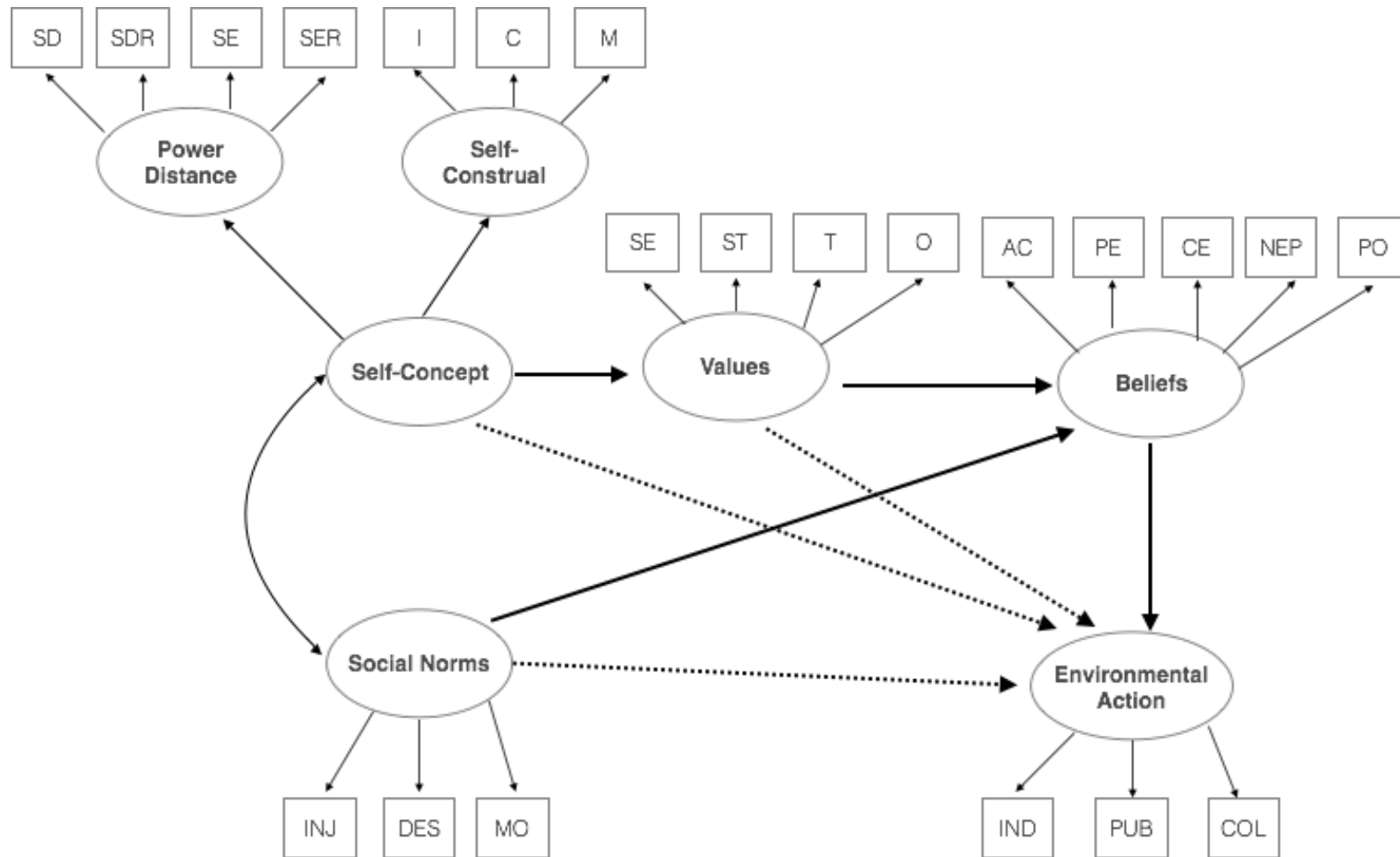
Figure 10. Alternative SMEA model (model B)

MODEL C
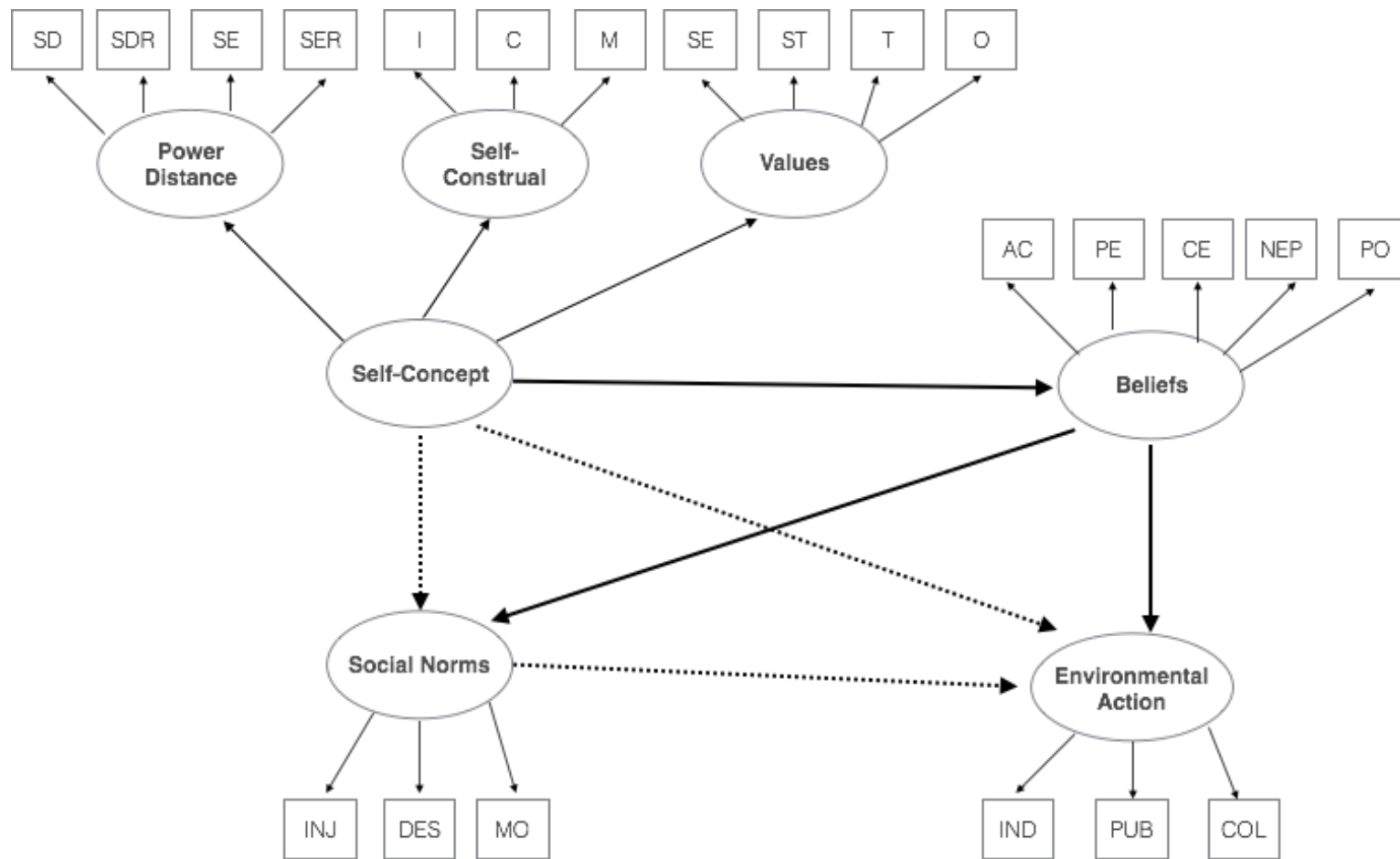
Figure 11. Alternative SMEA model (model C)

MODEL D
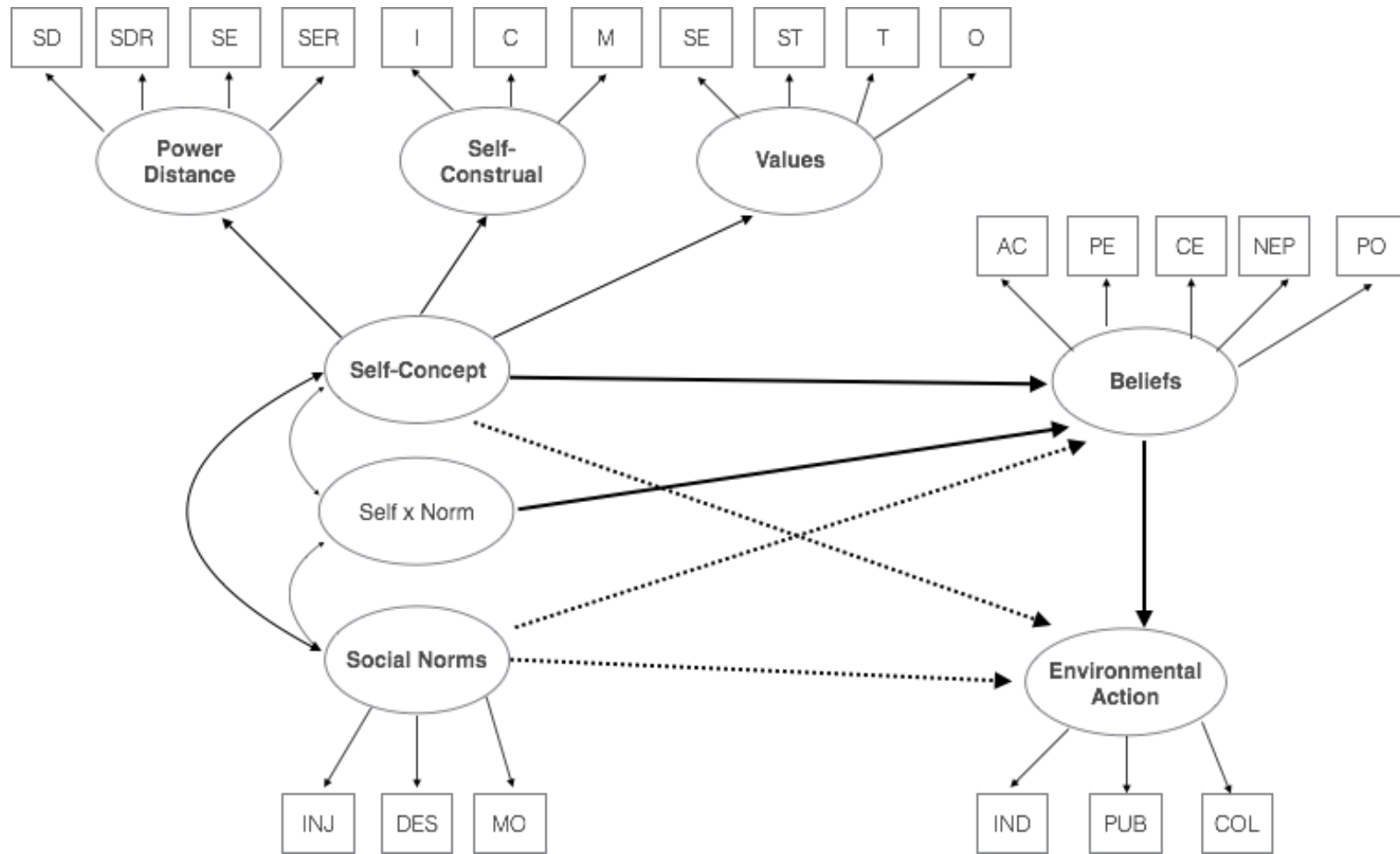
Figure 12. Alternative SMEA model (model D)

APPENDIX B

Measures

SELF CONCEPT

Self-Construal Scale
(Singelis 1994)

Please rate whether your agreement with each of the following items. When referring to "the group" you may think of a social group that is important to you, such as your family and friends, work, church, or your cultural or ethnic group.
Scale labels:
- Strongly disagree
- Disagree
- Somewhat disagree
- Neither Disagree or Agree
- Somewhat agree
- Agree
- Strongly agree

Interdependence items:	Strongly disagree					Strongly Agree	
1. I have respect for the authority figures with whom I interact	1	2	3	4	5	6	7
2. It is important for me to maintain harmony within my group	1	2	3	4	5	6	7
3. My happiness depends on the happiness of those around me	1	2	3	4	5	6	7
4. I would offer my seat in a bus to my boss	1	2	3	4	5	6	7
5. I respect people who are modest about themselves	1	2	3	4	5	6	7
6. I will sacrifice my self-interest for the benefit of the group I am in	1	2	3	4	5	6	7
7. I often have the feeling that my relationships with others are more important than my own accomplishments	1	2	3	4	5	6	7
8. I should take into consideration my parents' advice when making education/career plans	1	2	3	4	5	6	7
9. It is important to me to respect decisions made by the group	1	2	3	4	5	6	7
10. I will stay in a group if they need me, even when I'm not happy	1	2	3	4	5	6	7

with the group							
11. If my brother or sister fails, I feel responsible	1	2	3	4	5	6	7
12. Even when I strongly disagree with group members, I avoid an argument	1	2	3	4	5	6	7
Independent Items:							
13. I'd rather say "No" directly, than risk being misunderstood	1	2	3	4	5	6	7
14. Speaking up during a meeting is not a problem for me	1	2	3	4	5	6	7
15. Having a lively imagination is important to me	1	2	3	4	5	6	7
16. I am comfortable with being singled out for praise or reward	1	2	3	4	5	6	7
17. I am the same person at home as I am at work	1	2	3	4	5	6	7
18. Being able to take care of myself is a primary concern for me	1	2	3	4	5	6	7
19. I act the same way no matter who I am with	1	2	3	4	5	6	7
20. I feel comfortable using someone's first name soon after I meet them, even when they are much older than I am	1	2	3	4	5	6	7
21. I prefer to be direct and forthright when dealing with people I've just met	1	2	3	4	5	6	7
22. I enjoy being unique and different from others in many respects	1	2	3	4	5	6	7
23. My personal identity independent of others, is very important to me	1	2	3	4	5	6	7
24. I value being in good health above everything	1	2	3	4	5	6	7

Metapersonal Self-Construal (MPS, De Cicco & Stroink, 2007)

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement circle the number that best matches your agreement or disagreement using the scale provided. Please respond to every statement.

	Strongly Disagree						Strongly Agree
25. My personal existence is very purposeful and meaningful	1	2	3	4	5	6	7
26. I believe that no matter where I am or what I am doing, I am never separate from others	1	2	3	4	5	6	7
27. I feel a real sense of kinship with all living things	1	2	3	4	5	6	7
28. My sense of inner peace is one of the most important things to me	1	2	3	4	5	6	7
29. I take time each day to be peaceful and quiet, to empty my mind of everyday thoughts	1	2	3	4	5	6	7
30. I believe that intuition comes from a higher part of myself and I never ignore it	1	2	3	4	5	6	7
31. I feel a sense of responsibility and belonging to the universe	1	2	3	4	5	6	7
32. My sense of identity is based on something that unites me with all other people	1	2	3	4	5	6	7
33. I am aware of a connection between myself and all living things	1	2	3	4	5	6	7
34. I see myself as being extended into everything else	1	2	3	4	5	6	7

Social Dominance Orientation (Ho et al., 2015)

Show how much you favour or oppose each idea below by selecting a number from 1 to 7 on the scale below. You can work quickly; your first feeling is generally best.

Scale labels:
- Strongly oppose
- Oppose
- Somewhat oppose
- Neither oppose or favor
- Favor
- Strongly favor

	Strongly oppose						Strongly favor
35. Some groups of people must be kept in their place (SD)	1	2	3	4	5	6	7
36. It's probably a good thing that certain groups are at the top and other groups are at the bottom (SD)	1	2	3	4	5	6	7
37. An ideal society requires some groups to be on top and others to be on the bottom (SD)	1	2	3	4	5	6	7
38. Some groups of people are simply inferior to other groups (SD)	1	2	3	4	5	6	7
39. Groups at the bottom are just as deserving as groups at the top (SDR)	1	2	3	4	5	6	7
40. No one group should dominate society (SDR)	1	2	3	4	5	6	7
41. Groups at the bottom should not have to stay in their place (SDR)	1	2	3	4	5	6	7
42. Group dominance is a poor principle (SDR)	1	2	3	4	5	6	7
43. We should not push for group equality (SER)	1	2	3	4	5	6	7
44. We shouldn't try to guarantee that every group has the same quality of life (SER)	1	2	3	4	5	6	7
45. It is unjust to try to make groups equal (SER)	1	2	3	4	5	6	7
46. Group equality should not be our primary goal (SER)	1	2	3	4	5	6	7
47. We should work to give all groups an equal chance to succeed (SE)	1	2	3	4	5	6	7

48. We should do what we can to equalize conditions for different groups (SE)	1	2	3	4	5	6	7
49. No matter how much effort it takes, we ought to strive to ensure that all groups have the same chance in life (SE)	1	2	3	4	5	6	7
45. Group equality should be our ideal (SE)	1	2	3	4	5	6	7

Brief Inventory of Values (Stern, Dietz, & Guagnano, 1998)

For the following items, please tell us how important each of these values is as a guiding principle in your life:

Scale labels:
- Not at all important
- Not important
- Somewhat unimportant
- Neutral
- Somewhat important
- Important
- Very important

	Not at all Important						Very important
51. Protecting the environment (ST)	1	2	3	4	5	6	7
52. Unity with nature (ST)	1	2	3	4	5	6	7
53. Respecting the earth (ST)	1	2	3	4	5	6	7
54. A world at peace, free of war and conflict (ST)	1	2	3	4	5	6	7
55. Social justice, correcting injustice, care for the weak (ST)	1	2	3	4	5	6	7
56. Equality, equal opportunity for all (ST)	1	2	3	4	5	6	7
57. Preventing pollution (ST)	1	2	3	4	5	6	7
58. Honoring parents and elders, showing respect (T)	1	2	3	4	5	6	7
59. Family security, safety for loved ones (T)	1	2	3	4	5	6	7
60. Self-discipline, self-restraint, resistance to temptation (T)	1	2	3	4	5	6	7
61. Being honest (T)	1	2	3	4	5	6	7
62. Being obedient (T)	1	2	3	4	5	6	7
63. Being loyal (T)	1	2	3	4	5	6	7

	1	2	3	4	5	6	7
64. Being forgiving (T)	1	2	3	4	5	6	7
65. Being helpful (T)	1	2	3	4	5	6	7
66. Being a true friend (T)	1	2	3	4	5	6	7
67. Having authority, the right to lead or command (SE)	1	2	3	4	5	6	7
68. Being influential, having an impact on people and events (SE)	1	2	3	4	5	6	7
69. Wealth, material possessions, money (SE)	1	2	3	4	5	6	7
70. Social power (SE)	1	2	3	4	5	6	7
71. Having a varied life, filled with challenge, novelty, and change (O)	1	2	3	4	5	6	7
72. Having an exciting life, stimulating experiences (O)	1	2	3	4	5	6	7
73. Being curious, interested in everything, exploring (O)	1	2	3	4	5	6	7

BELIEFS

Personal Efficacy (PE, Adapted from Van Zomeren, Saguy, & Schellhaas, 2012)

For each statement below, please rate your agreement or disagreement:

	Strongly Disagree						*Strongly Agree*
74. I believe that I, as an individual, can contribute greatly so that as a group we can mitigate climate change	1	2	3	4	5	6	7
75. I believe that I, as an individual, can provide an important contribution so that together we can mitigate climate change	1	2	3	4	5	6	7
76. I believe that I, as an individual can provide a significant contribution so that, through joint actions we can mitigate climate change	1	2	3	4	5	6	7
77. I believe that I, as an individual can contribute meaningfully so that we can achieve our common goal of mitigating climate change	1	2	3	4	5	6	7
78. I feel a personal responsibility to act to prevent climate change	1	2	3	4	5	6	7

Collective Efficacy (CE, Adapted from Van Zomeren, Saguy, & Schellhaas, 2012)

For each statement below, please rate your agreement or disagreement:

	Strongly Disagree						*Strongly Agree*
79. As people, I think we can mitigate climate change	1	2	3	4	5	6	7
80. As people, I think we can influence the situation of climate change	1	2	3	4	5	6	7
81. I think that, as people, we can successfully defend our interests on the issue of climate change together	1	2	3	4	5	6	7
82. I think that, as people we can change this environmental situation together	1	2	3	4	5	6	7

Awareness of Consequences (AC, Stern, et al., 1999)

For each question below, please indicate how serious you think the problem of climate change will be within your lifetime.

Scale labels:
- Not a problem
- Not a serious problem
- Not very serious problem
- Neutral
- Somewhat serious problem
- Serious problem
- Very serious problem

	Not a problem				Very serious problem		
83. In general, do you think climate change, which is sometimes called global warming, will be a problem for you and your family?	1	2	3	4	5	6	7
84. Do you think climate change will be a problem for the country as a whole?	1	2	3	4	5	6	7
85. Do you think climate change will be a problem for other species of plants and animals?	1	2	3	4	5	6	7

Personal Obligation (PO, Stern et al., 1999)

	Strongly Disagree				*Strongly Agree*		
86. I feel a personal obligation to do whatever I can to prevent climate change.	1	2	3	4	5	6	7

New Ecological Paradigm (NEP, Dunlap et al., 2000)

Please rate your agreement or disagreement with each statement using the categories provided.

	Strongly Disagree				*Strongly Agree*		
87. We are approaching the limit of the number of people the earth can support	1	2	3	4	5	6	7
88. Humans have the right to modify the natural environment to suit	1	2	3	4	5	6	7

their needs							
89. When humans interfere with nature it often produces disastrous consequences	1	2	3	4	5	6	7
90. Human ingenuity will insure that we do NOT make the earth unlivable	1	2	3	4	5	6	7
91. Humans are severely abusing the environment	1	2	3	4	5	6	7
92. The earth has plenty of natural resources if we just learn how to develop them	1	2	3	4	5	6	7
93. Plants and animals have as much right as humans to exist	1	2	3	4	5	6	7
94. The balance of nature is strong enough to cope with the impacts of modern industrial nations	1	2	3	4	5	6	7
95. Despite our special abilities humans are still subject to the laws of nature	1	2	3	4	5	6	7
96. The so-called "ecological crisis" facing humankind has been greatly exaggerated	1	2	3	4	5	6	7
97. The earth is like a spaceship with very limited room and resources	1	2	3	4	5	6	7
98. Humans were meant to rule over the rest of nature	1	2	3	4	5	6	7
99. The balance of nature is very delicate and easily upset	1	2	3	4	5	6	7
100. Humans will eventually learn enough about how nature works to be able to control it	1	2	3	4	5	6	7
101. If things continue on their present course, we will soon experience a major ecological catastrophe	1	2	3	4	5	6	7

NORMS

Injunctive/Descriptive Norms (INJ, DES, Rees & Bamberg, 2014)

Please rate your agreement or disagreement with each statement:

	Very Unlikely						*Very Likely*
102. People from your community that are personally important to you EXPECT that YOU behave in an environmentally-friendly way	1	2	3	4	5	6	7
103. People from your community that are personally important to you THEMSELVES behave in an environmentally friendly way	1	2	3	4	5	6	7

Moral norms (MO, Adapted from Rees & Bamberg, 2014 and Kaiser, 2006)

Please rate your agreement or disagreement with each statement:

	Strongly Disagree						*Strongly Agree*
104. I feel guilty about how we humans are treating the environment	1	2	3	4	5	6	7
105. Sometimes I feel ashamed when I realize what we leave behind for future generations	1	2	3	4	5	6	7
106. I am ashamed of what future generations might think of us because of our environmental behavior	1	2	3	4	5	6	7
107. When thinking about current lack of environmental protection efforts, I am angry at politics	1	2	3	4	5	6	7

Environmental Action
(Stern et al., 1999)

Individual intention:

How LIKELY are you to do any of the following in the NEXT 6 months:

Scale labels:
- Very unlikely
- Unlikely
- Somewhat unlikely
- Neither likely or unlikely
- Somewhat likely
- Likely
- Very likely

107. Make a special effort to buy fruits and vegetables grown without pesticides or chemicals (also known as organic fruits and vegetables)?

108. Make a special effort to buy paper and plastic products that are made from recycled materials?

109. Avoid buying products from companies that you know might be harming the environment?

110. Make a special effort to buy household chemicals such as detergents and cleaning solutions that are environmentally friendly?

111. Bike, walk, take public transit, or carpool?

112. Reduce the use of disposable products?

113. Be willing to pay much higher prices in order to protect the environment?

114. Be willing to accept cuts in your standard of living in order to protect the environment?

115. Be willing to pay higher taxes in order to protect the environment?

Public Intentions:

116. How LIKELY are you to do any of the following in the NEXT 6 months:
(Please check all that apply)
- Sign a petition in support of promoting the environment?
- Share stories about climate change or sustainability on social media?
- Give money to an environmental group?

- Boycott or avoid buying the products of a company because you feel the company is harming the environment?
- Read newsletters, magazines, or other publications written by an environmental group?
- Vote for a candidate in an election at least in part because he or she is in favour of strong environmental protection?

Collective Intentions:

117. How LIKELY are you to do any of the following in the NEXT 6 months:
(Please check all that apply)
- Join a group whose main aim is to preserve or protect the environment?
- Recruit others to join an environmental rally, protest, or group?
- Organize a protest or group event related to environmental action?
- Influence your workplace or organization to be more sustainable?
- Participate in a climate change demonstration?
- Actively support an environmental movement by participating in collective action?

Individual Behaviour:

For the following questions, please think of your behavior over the PAST 6 months.

Scale labels:
- Never
- Rarely
- Not often
- Sometimes
- Somewhat frequently
- Frequently
- All the time

118. How often did you make a special effort to buy fruits and vegetables grown without pesticides or chemicals, also known as organic fruits and vegetables?

119. How often did you make a special effort to buy paper and plastic products that are made from recycled materials?

120. How often did you avoid buying products from a company that you know might be harming the environment?

121. How often did you make a special effort to buy household chemicals such as detergents and cleaning solutions that are environmentally friendly?

122. How often did you bike, walk, take public transit, or carpool?

123. How often did you use disposable products?
124. How often did you pay much higher prices in order to protect the environment?
125. How often did you accept cuts in your standard of living in order to protect the environment?
126. How often did you pay higher taxes in order to protect the environment?

Public Behaviour:

127. In the LAST 6 months, HAVE you:
- Given money to an environmental group?
- Shared stories about climate change or sustainability on social media?
- Read any newsletters, magazines, or other publications written by an environmental group?
- Signed a petition in support of promoting the environment?
- Boycotted or avoided buying the products of a company because you felt the company was harming the environment?
- Voted for a candidate in an election at least in part because he or she was in favor of strong environmental protection?

Collective behaviour:

128. Are you a member of any group whose main aim is to preserve or protect the environment? *Yes* _____ *No* _____

129. In the LAST 6 months HAVE you: (please check all that apply)

- Participated in a climate change demonstration?
- Influenced your workplace or organization to be more sustainable?
- Organized a protest or group event related to environmental action?
- Recruited others to join an environmental rally, protest, or group?
- Actively supported an environmental movement by participating in collective action?
- Joined a group whose main aim is to preserve or protect the environment?

Climate Change Knowledge (Guy et al., 2014)

Below is a list of possible causes for climate change. For each item, please indicate whether you think it causes climate change, does not cause climate change, or don't know.

	Causes climate change	*Does not cause climate change*	*Don't know*
130. Destruction of forests			
131. Use of aerosol spray cans			
132. Depletion of ozone in the upper atmosphere			
133. Pollution/emissions from business and industry			
134. People driving their cars			
135. Use of chemicals to destroy insect pests			
136. People heating and cooling their homes			
137. Use of coal and oil by utilities and electric companies			
138. Nuclear power generation			

Demographics

139. What is your gender?
140. What is your age?
125. What is your race/ethnicity: (check all that apply)
   • Asian
   • American Indian or Alaska Native
   • Black/African American
   • White
   • Native Hawaiian or Other Pacific Islander
   • Hispanic (Mexican, Puerto Rican, Cuban, Central or South American, other Hispanic)
   • Other, please specify:

142. People also describe themselves in terms of their cultural or ethnic group (e.g., Bengali, Jamaican, Taiwanese etc.) How would you describe your cultural/ethnic group?

143. How much do you agree or disagree with the following statement: "I identify with American culture"

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree or disagree
- Somewhat agree
- Agree
- Strongly agree

144. What language(s) do you speak?
145. Where do you currently reside?
146. What is your country of birth?
147. Number of years you have lived in the US?
148. What political party do you identify with?
- Democrats
- Independent
- Republicans
- Not affiliated/don't vote
- Other, please specify:

149. In general, you would describe your political views as:
- Very conservative
- Conservative
- Moderate
- Liberal
- Very liberal
- Other, please specify:

150. Overall, does the Republican Party or the Democratic Party come closer to your views on: (Republican, Democratic, Neither, Don't know)
- Social issues (e.g., abortion, gay marriage, immigration, health care)
- Economic issues (e.g., jobs, budget deficit)
- Environmental issues (e.g., climate change, pollution, fracking)

151. What is your education level? (check highest level completed):
- Less than 9th grade
- High school graduate
- Some college, no degree
- Associate's degree
- Bachelor's degree
- Graduate or professional degree
- Prefer not to answer

152. What is your employment status?
- Employed full-time
- Employed part-time
- Unemployed
- Prefer not to answer

134. What is your annual household income?

- Less than $30,000
- Between $30,000 to $50,000
- Between $50,000 to $70,000
- Between $70,000- $100,000
- More than $100,000
- Prefer not to answer

APPENDIX C
Letter of Consent to Participate in Research
Title of Study: Environmental values, beliefs, norms, and actions

You are asked to participate in a research study conducted by Natasha Koustova and Dr. Catherine T. Kwantes, from the Department of Psychology at the University of Windsor. The results from this study will contribute to the completion of a doctoral dissertation.

If you have any questions or concerns about the research, please feel free to contact Natasha Koustova at **environmentstudyuwindsor@gmail.com** or Dr. Catherine Kwantes at 519-253-3000 x 2242.

PURPOSE OF THE STUDY

The purpose of this study is to investigate cultural values, beliefs, and norms and environmental behaviors in the United States.

You are invited to participate in this study if you meet <u>all</u> of the following requirements:

1. You are an adult (18 years or older)
2. You currently reside in the United States
3. You are fluent in English
4. Amazon Mechanical Turk Qualification: 90% HIT approval rate

PROCEDURES

If you volunteer to participate in this study, you will be asked to complete an online questionnaire containing measures of values, beliefs, norms, and environmental behaviors.

The survey will take approximately 15-20 minutes to complete.

To participate, please do the following:
1. Select the "YES" option at the bottom of this page. By selecting the "YES" option, you agree to participate in this study.
2. Please follow the instructions for completing the survey questions, which will be found at the beginning of each survey section.
Upon completion of the questionnaire, please make sure to submit your responses by clicking on the "Submit" button at the end of the survey.

You will then be redirected to a page that contains the survey code for this HIT. Please use this code for your HIT submission. Please print this page for your records.

POTENTIAL RISKS AND DISCOMFORTS

Although unlikely, some questions about climate change may make you feel anxious, scared, or uncomfortable. You may be concerned that you might be penalized if you don't answer the questions the right way or complete all the questions. All your responses will be completely anonymous. Please skip any questions you do not wish to answer. You may also discontinue your participation at any time. However, please note that you will only be eligible for the $0.75 participation incentive if you complete 80% (122 out of 153 questions) or more of the survey questions.

If you choose to withdraw from the study or otherwise not complete the study, please be sure to return to AMT and withdraw from this study HIT.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

By participating in this study, you may gain a better understanding of your own values, attitudes, and behaviors in regards to climate change. You may be able to better articulate your own feelings on the topic after completing this study. You may find you are happy with your efforts or you may get new ideas for how to change your behavior.

This study has potential benefits to society because it will expand our understanding of climate change attitudes and pro-environmental behavior, and have implications for ways we can address the problem.

COMPENSATION FOR PARTICIPATION

You will receive $0.75 in compensation for participating in this study. However, you must complete at least 80% (122 out of 153 questions) in order to be eligible for compensation.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission.

To ensure confidentiality, you will not be asked to provide any identifiable information, such as your name or contact information. Your worker ID is not linked to your responses; there will be no way to trace your answers to your AMT profile or personal information. This survey automatically collects State location data. Results of this study will be published as group totals only, and all the information you provide will be held in strict confidence. Amazon Mechanical Turk will not have access to your survey data. All data will be stored on a secure server on a password-protected computer. Anonymous data will be kept indefinitely. If you email the researcher regarding this HIT you will no longer be anonymous. After your issue is resolved, all email correspondence and personal information will be deleted in order to protect your confidentiality. Please do not share any personal identifying information with the researcher except your AMT worker ID number.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You can withdraw your data at any time prior to submitting your survey by closing your browser window or clicking "Exit Survey" button.

You may also refuse to answer any questions you don't want to answer and still remain in the study. Please note that you must answer 80% (122 out of 153 questions) or more of the survey questions to be eligible for the $0.75 participation incentive. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

Once you have submitted your survey (by clicking the "Submit" button on the last page of the survey) it is no longer possible to withdraw your data.

If you choose to withdraw from the study or choose to otherwise not complete the study, please be sure to return to AMT and withdraw from this study HIT.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

The results of this study will be made available on the website of the Research Ethics Board at the University of Windsor:

Web address: www.uwindsor.ca/reb
Date when results are available: October 2016

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

PLEASE PRINT A COPY OF THIS LETTER FOR YOUR RECORDS

DO YOU WISH TO CONTINUE?

To acknowledge that you have read and understood the information provided to you about the study, "Environmental values, beliefs, norms, and actions" and that you would like to continue with the survey please click on the "Yes" button"

      ◯   Yes   ◯ No

APPENDIX D
Post-Study Information

Dear participant, Thank you for participating in this research project!

Please use the following survey code for compensation Amazon Mechanical Turk: ENVUWIN

In participating in this study, you filled out a number of measures about your values, attitudes, beliefs, and behaviors. The goal of this study is to investigate the influence of cultural values and norms on attitudes and beliefs about climate change, and personal and collective behavior.

Researchers tend to focus on what an individual can do to be more environmentally friendly. They tend to encourage behaviors like biking or taking public transit, eating organic food, or buying less. But all those things are hard to do consistently, partly because our society is not set up to make those behaviors easy, and partly because it is hard to feel like you are making an impact when so many others continue behaving in environmentally destructive ways. To address these barriers, this study focuses on bringing together individual and collective action.

Your contribution will expand the understanding of how social context and individual attitudes influence participation in individual and collective environmental actions. The results of this study may have implications for social interventions to help address climate change.

If you would like more information about what you can do or how to connect with like-minded others, please check out the following resources:

Intergovernmental Panel on Climate change report: http://www.ipcc.ch/report/ar5/wg2/
Your carbon footprint: http://www.carbonfootprint.com/calculator.aspx
Ways to reduce plastic waste: http://myplasticfreelife.com/plasticfreeguide
Work with others to propose ways to tackle climate change: http://climatecolab.org
Join the global climate movement: http://350.org
Communicating about climate change with others: http://climateaccess.org

If you wish to prevent others who have access to your computer from seeing that you viewed this study's website, you can use the following information to delete your browsing history:

Google Chrome: Settings → History → Clear browsing data
Internet Explorer: Settings → Internet Options → General → Delete browsing history
Safari: History → Clear history
Firefox: History → Clear recent history

If you have any further questions about this study, please feel free to contact Natasha

Koustova at environmentstudyuwindsor@gmail.com. **Please print this page for your records.**

Thank you very much for your participation. It is greatly appreciated!

Sincerely,
Natasha Koustova, M.A.
Catherine T. Kwantes, Ph.D.
Department of Psychology
University of Windsor

APPENDIX E

Participant Demographic Information

Table 15

Participant Demographic Information

Variable	*N*	%
Gender		
Male	203	41.9
Female	280	57.7
Non-binary	1	0.2
Ethnicity		
White/Caucasian	371	76.0
Black/African American	39	8.0
Hispanic	28	5.8
Asian (Japanese, Chinese, Indonesian, Indian, or Middle Eastern)	23	4.7
Mixed origin	17	3.5
Native American/Aboriginal & Hawaiian/ Pacific Islander	8	1.6
Employment		
Full-time	298	61.4
Part-time	75	15.5
Unemployed	87	17.9
Prefer not to answer	23	4.7
Income (Household)		
< $30,000	134	27.6
$30,000 - $50,000	110	22.7
$50,000 - $70,000	96	19.8
$70,000 - $100,000	82	16.9
> $100,000	54	11.1
Prefer not to answer	9	1.9
Level of Education		
Less than 9th grade	1	.2
High school graduate	41	8.5
Some college, no degree	107	22.1
Associate's degree	58	12.0
Bachelor's degree	184	37.9
Graduate or professional degree	91	18.8
Prefer not to answer	1	.2
Political Identity		
Republican	110	22.7
Democrat	195	40.2
Independent	180	37.1

Political Views		
Very conservative	112	23.1
Conservative	214	44.1
Moderate	157	32.4
Liberal	0	0
Very liberal	0	0
Political views: Social issues		
Republican	117	24.1
Democratic	270	55.7
Neither	97	20.0
Political views: Economic issues		
Republican	165	34.0
Democratic	201	41.5
Neither	118	24.4
Political views: Environmental issues		
Republican	76	15.7
Democratic	243	50.1
Neither	161	33.2

APPENDIX F

Political Identity

Table 16

Political Identity

Political identity	Total	Social issues	Economic Issues	Environmental Issues	Political Views
Republicans	110				
Republican		77.30%	81.80%	56.40%	76.4% very conservative
Democrat		11.80%	9.10%	11.80%	2.7% conservative
Neither		10.90%	9.10%	30%	20% moderate
Democrats	195				
Republican		2.10%	9.20%	0	2.6% very conservative
Democrat		91.30%	77.90%	82.60%	85.6% conservative
Neither		6.70%	12.80%	16.40%	11.3% moderate
Independents	179				
Republican		15.60%	31.70%	7.80%	12.8% very conservative
Democrat		43.90%	21.70%	38.30%	24.4% conservative
Neither		40%	46.10%	53.30%	62.8% moderate

VITA AUCTORIS

NAME:	Natalia (Natasha) Vladimirovna Koustova
PLACE OF BIRTH:	Krasnoyarsk, Russia
YEAR OF BIRTH:	1985
EDUCATION:	Vaughan Secondary School, Thornhill, ON, 2002
	York University, B.A. (Hons.), Toronto, ON, 2007
	University of Windsor, M.A., Windsor, ON, 2011