

AFFECTIVE AND MORAL ROOTS OF ENVIRONMENTAL STEWARDSHIP:
THE ROLE OF OBLIGATION, GRATITUDE AND COMPASSION

by

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DISSERTATION ABSTRACT

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Title: Affective and Moral Roots of Environmental Stewardship: The Role of Obligation, Gratitude and Compassion

Environmental issues such as climate change and habitat loss pose significant challenges to existing political, legal and financial institutions. As these challenges have become clearer in recent years, interest in understanding the psychological, cultural and moral motivators of environmental stewardship has grown. Recent research within the social sciences—particularly psychology, sociology and communications—has revealed numerous intra- and interpersonal processes and mechanisms that shape whether, how and to what extent individuals and communities engage with the environmental problems they face. In this dissertation, I integrate research from these and other fields to examine the role that affect, identity and morality play in driving individual-level concern about and response to environmental challenges. Across three chapters (which present results from eight empirical studies), I attempt to answer a series of core research questions, including: (1) What is the role of affect in motivating active engagement with environmental issues? (2) What factors shape recognition of problems such as climate change as morally relevant? (3) What can we learn by studying the interaction of affect and morality in the context of environmental conservation? (4) What are the limits of the affective and moral judgment systems in motivating environmental concern and action?

In Chapter II (*‘Is climate change an ethical issue?’*), I show that relatively few people identify climate change as a moral issue, that such perceptions are shaped in part by individuals’ beliefs about the causes of the problem, and that perceived moral obligation predicts behavioral intentions. In Chapter III (*‘Who cares about the future?’*), I further examine the affective roots of environmental moral beliefs and demonstrate that feelings of gratitude towards past generations enhance individuals’ perceptions of responsibility towards future generations. Finally, in Chapter IV (*‘Are pandas like people?’*), I find limits to the role of affect in motivating beneficent action on behalf of non-human others. Together, these three chapters provide novel and actionable insights into some of the factors that shape individual-level environmental stewardship.

This dissertation includes both previously published sole-authored (Chapter II) and unpublished co-authored (Chapter IV) material.

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For the generations that will inherit the world we choose to leave them

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CHAPTER I

INTRODUCTION

There is a growing interest among practitioners, policymakers and scholars in understanding the underlying psychological and cultural factors that influence our individual and collective willingness to address the environmental challenges we face. This newfound interest has grown, in part, out of frustration with existing approaches to motivating individuals and communities to action; it has also stemmed from a recognition that the barriers to confronting “super wicked problems” such as climate change (Lazarus, 2009) are not only scientific, technical, economic and political in nature, but moral, cultural and psychological as well (Gifford, 2011; Jamieson, 2010; Norgaard, 2011; Swim et al., 2011). For example, the repeated failure of early efforts to reduce household energy use by employing informational strategies and incentive-oriented policies spurred research in environmental decision-making that looked beyond simplistic “knowledge-deficit” models of behavior (Gardner & Stern, 2002), although such earlier models are still pervasive (Kellstedt, Zahran & Vedlitz, 2008). The research that has resulted from this refocusing on the *human dimensions* of environmental conservation has begun to produce important and actionable insights for policymakers, environmental advocates and others who are interested in finding effective solutions to environmental issues (e.g., Gardner & Stern, 2002; Maibach, Roser-Renouf & Leiserowitz, 2008).

The past twenty years has also witnessed an explosion of research on *affect*, “the positive and negative feelings that combine with reasoned analysis to guide our judgments, decisions and actions” (Slovic, 2007, p. 79). This research, which spans multiple fields within the social sciences, has consistently revealed that affective processes—which include both rapid, subconscious intrapersonal mechanisms as well as interpersonally constructed phenomena (cf., Parkinson, 1996)—play a central role in shaping our perceptions of the world around us, our interactions with others, and many of

the decisions we make throughout the course of daily life (cf., Loewenstein, Weber, Hsee & Welch, 2001; Zajonc, 1980). Building on this and earlier work, recent research in the field of moral psychology has highlighted the critical role that affect and emotions play in driving our perceptions of right and wrong, blame and responsibility—that is, in molding our beliefs about morality (see Greene, Sommerville, Nystrom, Darley & Cohen, 2001; Haidt, 2001; Haidt & Kesebir, 2010 for an overview). As work on morality, affect and decision-making have come together, it has become increasingly clear that both our ability and willingness to respond to morally relevant issues and challenges (e.g., climate change) are affected by the way in which the human moral judgment system operates (Markowitz & Shariff, 2012).

Researchers have only recently begun to integrate research on affect and morality (from a descriptive perspective) into the study of environmental decision-making and engagement, but already this interdisciplinary area of research is providing novel insights. For example, work by Feinberg and Willer (in press) has shown that individuals are better able (or perhaps willing) to identify issues such as environmental degradation as morally significant when those issues are framed in ways that are consonant with the moral values and intuitions that they already hold (see Haidt & Graham, 2007); this work holds important implications for the design of campaigns aimed at increasing public engagement with issues such as climate change, particularly in a politically polarized era (Nisbet, Markowitz & Kotcher, in press). In a related vein, work on the role of collective guilt, group identification, perceived efficacy and beliefs about the causes of global climate change has revealed that people feel guilty about the problem (and as a result are more willing to respond), but only when they believe that the phenomenon is anthropogenic and that something can be done to solve it (Ferguson & Branscombe, 2010; see Cameron & Payne, 2011, discussed in Chapter IV, for one possible explanation of these effects). Other individual- and group-level work on affect, morality and

environmental engagement (or lack thereof) is similarly expanding our understanding of the challenges we face in confronting these issues (cf., Lertzman, 2009; Mazar & Zhong, 2010; Norgaard, 2011; Swim & Bloodhart, 2011).

Although significant strides have been made in recent years to integrate research on affect, morality, and public engagement with environmental issues, much work remains to be done, particularly with respect to explicating underlying mechanisms and relationships among these constructs. Building off of the initial integrative efforts mentioned above, this dissertation aims to expand our understanding of psychological- and cultural-level processes that affect whether and to what extent individuals engage with issues of environmental sustainability and stewardship. In particular, the studies I discuss in the following chapters address a series of core research questions.

- First, what role do affective processes and mechanisms play in motivating active engagement with environmental issues (at the individual level)?
- Second, what factors shape individuals' recognition of environmental issues as morally relevant, and what implications do such perceptions have for willingness to respond to the challenges we face?
- Third, how do affect and morality interact with one another in the context of environmental conservation efforts, and what insights can be gained by studying these points of intersection?
- Finally, what are the limits of the affective and moral judgment systems in the context of environmental stewardship—that is, when do these critical systems break down and lead to behavior that is contradictory to individuals' and communities' stated beliefs and preferences?

This dissertation examines these research questions in a series of three papers, which together report results from eight empirical studies and experiments involving over 2,500 participants (all of whom are American adults). Although each set of studies

explores and addresses a distinct aspect of the role that affect and morality play in shaping environmental engagement and stewardship, the three papers overlap in ways that allow us to begin drawing broader conclusions about the factors that affect individuals' environmentally relevant beliefs, attitudes and actions. Together, the three projects presented in this dissertation begin to answer the questions posed above while raising many more questions and highlighting numerous directions for future research. Below, I briefly introduce and summarize findings from each of the three papers. It must be noted that Chapter II has been published (with no co-authors) in the journal *Climatic Change* and that Chapter IV has been submitted for publication as a co-authored article (with Paul Slovic, Daniel Vastfjall and Sara Hodges).

Overview of papers

In the first paper (*Chapter II: 'Is climate change an ethical issue?'*), I begin by examining the extent to which individuals' (in this case, American undergraduate students') beliefs about climate change and ethics align with the positions that have been staked out by environmental moral philosophers in recent years (cf., Gardiner, 2007; Jamieson, 2010; Singer, 2006). Jamieson and others have argued that climate change is fundamentally a moral issue (primarily due to its negative impacts on innocent people and animals) and that both individuals and communities thus have a moral imperative to take ameliorative action (see also Hourdequin, 2010). Finding in Study 1 that only a minority of students identify climate change as an ethical issue, I next explore both the etiology of such climate ethics beliefs and, critically, their downstream consequences (i.e., on willingness to engage in proenvironmental action). I find that individuals' beliefs about the causal structure of climate change (i.e., anthropogenic vs. naturally occurring) have a significant influence on perceptions of moral obligation, which in turn positively predict proenvironmental intentions. These findings, which are in line with other recent work by myself and others (cf., Feinberg & Willer, in press; Ferguson & Branscombe,

2010; Markowitz et al., in prep), highlight the importance of examining the intersection of morality and environmental stewardship from a descriptive rather than normative perspective, and raise important questions about the etiology of individuals' perceptions of environmental responsibility.

The second paper (*Chapter III: 'Who cares about the future?'*) takes up this question by exploring the role of affect in shaping our perceptions of responsibility towards future others in the context of environmental issues such as climate change (Study 1), fossil fuel use (Study 2) and maintaining the U.S. National Parks System (Study 3). In particular, I integrate past research on “intergenerational reciprocity” (Wade-Benzoni, 2002)—which finds that individuals “reciprocate” the good deeds of past generations by acting beneficently towards future others—with the multidisciplinary literature on *gratitude* (see Emmons & McCullough, 2004; McConnell, 1993). In a series of three studies, I consistently find that both dispositional and situationally-induced feelings of gratitude, particularly those felt towards past generations for their beneficent actions and intentions, predict greater levels of perceived responsibility towards future generations; moreover, I find that individuals who feel more grateful towards past others after being reminded of their actions (Studies 2 and 3) demonstrate greater levels of intergenerational environmental stewardship. I compare these effects of gratitude to those of two other previously proposed mechanisms by which individuals and communities come to care about the well-being of others in the intergenerational environmental context, namely, feelings of indebtedness (cf., Gouldner, 1960; Greenburg, 1980) and perceptions of fairness (Wade-Benzoni, 2002). I find that only gratitude shows a consistent, positive effect on environmental stewardship and engagement.

The findings presented in Chapter III suggest that positive affective mechanisms (e.g., gratitude, hope) play an important role in both supporting recognition of environmental issues as morally relevant as well as in motivating environmental

stewardship (see also Swim & Bloodhart, 2011). However, past research has also demonstrated that under certain conditions, affective processes may face important limits in their ability to motivate helping behavior towards individuals in need of aid (see Slovic, 2007; Weber, 2006). In the third paper (*Chapter IV: ‘Are pandas like people?’*), I explore these limits within the context of environmental stewardship. Specifically, I extend past work on what I refer to as *compassion fade*—which refers to the finding that compassion towards victims tends to *decrease* as the number of individuals in need of aid *increases* (cf., Cameron & Payne, 2008; Small, Loewenstein & Slovic, 2007)—into the context of providing aid to non-human animals in need (e.g., pandas, polar bears). In a series of three studies, I find that helping behavior decreases as the proportion of total victims that can be helped decreases (Study 1), the identifiability of the victims decreases (Study 2), and the number of identified victims in need of aid increases from one to two to eight (Study 3). However, I show that these compassion fade effects emerge only for individuals who do not self-identify as environmentalists; in contrast, committed environmentalists, individuals for whom responding to environmental issues is an important part of their personal identity, do not demonstrate compassion fade. These findings not only advance our understanding of the role that affect plays in the environmental domain (and perhaps beyond) but also hold important implications for conservation efforts, both at the grassroots and policy levels.

Final note

Taken together, the three papers presented in this dissertation tell a complex story about the individual-level and contextual factors that shape our willingness and ability to meaningfully engage with the many environmental challenges we face today. This body of work relies on the integration of research from a number of different fields to develop a novel understanding of the psychological and cultural barriers to environmental conservation, at least within the context of contemporary American culture. As noted

above, all of the studies described in the following chapters were run with adults living in the U.S. (and in some cases with undergraduate students), and it important to keep in mind that the mechanisms and effects discussed below may be specific to the groups that I studied (see *Chapter V: Discussion* for more on this important issue). That caveat aside, I believe that the work presented in this dissertation demonstrates the importance and usefulness of approaching issues of environmental sustainability and conservation from a multidisciplinary, and especially social scientific, perspective, one that recognizes the importance of treating these issues as the fundamentally *social* problems that they are.

CHAPTER II

IS CLIMATE CHANGE AN ETHICAL ISSUE? EXAMINING YOUNG ADULTS' BELIEFS ABOUT CLIMATE AND MORALITY

Reproduced with kind permission from Springer Science and Business Media from Markowitz, E. M. (2012). Is climate change an ethical issue? Examining young adults' beliefs about climate and morality. *Climatic Change*, DOI 10.1007/s10584-012-0422-8.

Introduction

Extant scholarship on the moral and ethical dimensions of climate change (cf., Broome 2008; Butler 2010; Davidson 2008; Gardiner 2006; Hourdequin 2010; Jamieson 2007, 2009; Singer 2006) potentially holds important implications for how both individuals and communities will respond to climate change in the near future (in particular via democratically driven changes in public policy; Jamieson 2007). However, the present body of (published) research is incomplete. Specifically, nearly all work completed to date on the 'ethics of climate change' has approached the issue from a normative perspective, relying primarily on philosophical claims about harms, rights and duties held by various stakeholders (e.g., rich individuals, future generations) to make the case that climate change is indeed an ethical issue (see below). This approach can provide useful insights, e.g., about why we might very well fail to act before it is 'too late' (Gardiner 2006), but it fails to ask whether, how and to what extent non-experts (i.e., members of the general public) understand¹ climate change in ethical terms.

The purpose of the present research is twofold: first, to explore whether or not non-experts' own moral judgments of climate change align with the moral philosophical position taken up by Jamieson, Gardiner, Hourdequin, Singer and others; and second, to examine the upstream etiology and downstream implications (e.g., behavioral intentions) of those judgments. Such moral judgments may have an important, perhaps fundamental, role to play in shaping responses to climate change in the coming years, yet we know little about the incidence and nature of such beliefs among various sectors of the public. Ultimately, non-experts' beliefs about climate change, including whether or not it poses a moral imperative, are likely to be at least as important in shaping our response to the issue as are expert declarations regarding the ethical, economic, social and technical aspects of climate change. After briefly exploring the moral philosophical position on climate change, I report the results of two recently conducted empirical studies in which I explored college students' beliefs about the ethical dimensions of climate change. I conclude the paper with a brief discussion and call for future research.

Why climate change is an ethical issue (and why we care if it is)

Over the past twenty years, a number of moral philosophers (among others) have explored whether anthropogenic climate change involves questions of good and bad, right and wrong, responsibility and blame (e.g., Davidson 2008; Gardiner 2006; Jamieson 2007, 2009; Shue 1993; Singer 2006). Taking a normative approach, these researchers have attempted to lay out how and why climate change poses an ethical problem for policymakers, economists and laypersons alike and thus why confronting climate change should be treated as a moral imperative (Broome 2008; Stern 2006).

Interest in the ethical dimensions of climate change stems, at least in part, from the fact that morality is a key driver of human (social) behavior (Haidt 2008). Both as individual actors and as collectives (families, communities, nations), we care deeply about right and wrong, about the intentions we see in others' actions (Guglielmo, Monroe, and Malle 2009), and about the implications of our and others' behavior with respect to questions of justice and harm (in addition to other concerns, e.g., loyalty, purity, respect for authority; see Haidt and Graham 2007). Thus, if climate change is recognized as an ethically significant issue, there may be reason to believe that people will be motivated to confront the causes of the problem effectively (i.e., emission of greenhouse gases, consumption; see Shwom, Bidwell, Dan and Dietz 2010 for initial supporting evidence, but see Gardiner 2006 for a more pessimistic outlook); on the other hand, if many individuals fail to identify climate change as a moral imperative, this may pose a significant barrier to effectively responding to the issue (individually and collectively).

Many of the arguments put forth by moral philosophers in support of the claim that climate change poses an ethical problem rest on two seemingly reasonable premises. The first is that the Earth's atmosphere, which provides significant life-sustaining services to humans and all other life on the planet, can be considered a public good, a piece of the global 'commons' (Hardin 1968). The second is that Earth's life-sustaining atmosphere is in fact a limited resource, subject to depletion and/or degradation under certain conditions. This second claim is especially important because, as Peter Singer (2006) clarifies, 'Climate change is an ethical issue, because it involves the distribution

of a scarce resource—the capacity of the atmosphere to absorb our waste gases without producing consequences that no one wants’ (Singer 2006: 415).

In a closely related vein, Jamieson (2009) argues that climate change is a moral issue in part because it involves ‘rich people appropriating more than their share of a global public good and, in addition, harming poor people by causally contributing to extreme climatic events such as droughts, hurricanes and heat waves’ (Jamieson 2009: 5). Thus, Jamieson slightly extends Singer’s argument by suggesting that past and present distributions of ‘atmospheric use’ are in fact unjust for two intertwined reasons. First, some people (i.e., rich individuals who primarily, but not exclusively, live in developed nations) have used and continue to self-appropriate more of the atmospheric commons than have others (i.e., poor individuals living primarily in developing nations). Second, such ‘atmosphere grabbing’ has the very real potential to cause physical (and psychological; see Doherty and Clayton, 2011) harm to many people (Broome 2008), including those who are not yet born. Additionally, the problem is compounded by the fact that the perpetrators of harm (i.e., those who emit greenhouse gases at levels far above what could reasonably be considered equitable; see Singer 2006) have not compensated those who are harmed by their actions. Critically, these arguments (as well as others made by moral philosophers on this topic, e.g., regarding moral obligations to be good stewards of the planet) appear to rely on the (scientifically valid) assumption that climate change is anthropogenic in origin; I return to this critical question of ‘causality’ below.

To the extent that the points discussed above reflect an accurate representation of the causes and consequences of climate change, the case for considering climate change

an ethical issue seems clear-cut. Indeed, in light of recent evidence suggesting that negative consequences of climate change are already occurring (e.g., the 2003 heat waves in Europe that caused over 70,000 premature deaths; World Health Organization 2010), many of the ‘complications’ that have been discussed at length in the (moral philosophical) literature on climate change (e.g., Parfit’s ‘non-identity’ problem and the question of harm to future generations; see Davidson 2008) seem moot. Thus, climate change is an ethical issue involving morally reprehensible behavior perpetrated by billions of individuals living now and in the past (Gardiner 2006; Jamieson 2009). But if we accept this conclusion, we are faced with a more troubling and difficult question: why do we, as individuals and as communities, continue to emit greenhouse gases at levels that are already causing harm to human and non-human life (IPCC 2007; World Health Organization 2010) if doing so is morally reprehensible?

Possible explanations of continued greenhouse gas emissions

There are likely many plausible, if partial, explanations we could employ to explain why we continue to dangerously emit greenhouse gases (Dessai et al. 2004), despite the plea from various moral philosophers and others (including some politicians, activists, economists and religious leaders, e.g., Benedict XVI 2009; Moore and Nelson 2010; Stern 2006) that we understand climate change as a moral issue that requires ameliorative action. Perhaps most non-experts and policymakers agree with Singer, Jamieson and others that climate change is an ethical issue, but they simply are unwilling to reduce their own consumption or to vote for policies that redistribute and restrain access to the atmospheric commons. An economically-minded analysis of individual and collective non-response might suggest that inaction arises (in part) due to the fact that

climate change mitigation efforts involve a massively multi-player prisoner's dilemma situation, in which each individual (household, community, country, etc.) has a strong incentive not to reduce greenhouse gas emissions personally (Helm 2008); through this lens, non-action might well be viewed as highly rational at the individual-actor level, regardless of any potential ethical concerns that might exist.

Alternatively, people may believe that the harms done to others via climate change were in fact perpetrated by past generations or by those living elsewhere, and thus while climate change does pose a moral problem, it is not our moral problem. Indeed, recent findings suggest that individuals actively work to avoid feeling responsible for climate change, in part by blaming others for their inaction and contributions to the problem (Stoll-Kleemann, O'Riordan and Jaeger 2001). Along related lines, Norgaard (2006, 2011) has argued that entire communities may engage in a motivated (if not necessarily conscious) process of socially constructed and reinforced climate change denial and avoidance, which allows daily life to proceed as normal despite knowledge of the harms one's actions impose on others. Diffusion of responsibility, feelings of inefficacy, motivated reasoning and information processing, and myriad other psychological and sociological mechanisms may also be at play (see Gardiner 2006; Kunda 1990; Lord, Ross and Lepper 1979; Swim et al. 2009; Swim, Markowitz and Bloodhart 2012). Of course, we know that a substantial number of individuals do not believe that climate change is even happening (cf., Leiserowitz, Maibach, Roser-Renouf and Smith 2011; Yeager, Larson, Krosnick and Tompson 2010), and there is little reason to expect these individuals to take the ethical ramifications of the issue seriously.

There is another possibility as well, namely, that we are not responding to climate change in a significant way because our moral intuitions do not match up with the position(s) staked out by the moral philosophers. That is, perhaps many or even most individuals do not have a clear sense that climate change is a moral imperative, or are at best unsure whether the ‘rules’ of morality apply in the case of (anthropogenic) climate change. If this is the case, then there is no reason to expect normative considerations of morality to be an effective motivator of ameliorative action regarding climate change², despite the urgings of moral philosophers, religious figures and others, in part because we tend to trust our own gut instincts regarding issues of morality more than we do the reasoned arguments provided by others (Haidt 2008). But what do we know about the moral intuitions of non-experts with respect to climate change, and what role, if any, do such intuitions play in driving individuals’ behavioral responses to the problem?

Moral intuitions and climate change

Jamieson, Gardiner, Davidson and others suggest there is reason to believe that many people, including some of those who believe climate change is indeed happening and is a problem, may not understand climate change in ethical terms. For example, Gardiner (2006) suggests that climate change poses a ‘perfect moral storm,’ leaving us ‘extremely vulnerable to moral corruption’ (397). According to Gardiner, both at the individual, psychological level as well as at the institutional, political level, certain features of climate change converge to ‘exacerbate and obscure a lurking problem of moral corruption’ (399). Specifically, Gardiner discusses three features of climate change that he believes may ‘cause problems for ethical behavior’ (398): temporal and spatial dispersion of causes and effects, the multiply determined nature of climate change

(‘fragmentation of agency’), and ‘institutional inadequacy’ (problems of the commons). Of course, other features of the problem, including uncertainty about the timing and magnitude of potential consequences and discounting the value of future versus present consumption (see also Weber 2006) also play a role. Gardiner argues that even if people recognize climate change as an ethical issue, these features of climate change may militate in favor of unethical behavior (i.e., a failure to reduce emissions adequately).

Jamieson (2007) is even more direct in making the claim that individuals fail to recognize climate change as a moral imperative: ‘We tend not to see climate change as a moral problem...[because it] is not a matter of a clearly identifiable individual acting intentionally so as to inflict an identifiable harm on another identifiable individual’ (Jamieson 2007: 477). That is to say, no one wants climate change to occur and is intentionally trying to bring about harm to future generations. As a result, ‘It [climate change] does not motivate us to act with the urgency characteristic of our responses to moral challenges’ (ibid.). Essentially, Jamieson argues that climate change does not fit the ‘paradigm[atic] moral problem’ in which one individual directly and causally harms another and thus that our moral intuitions regarding the issue may be relatively weak.

Recent work in the field of moral psychology appears to provide important, if indirect, support for both Jamieson’s and Gardiner’s (among others’) contentions. For example, research shows that actors who intentionally perform harmful acts are considered more blameworthy and punishable than are actors who unintentionally bring about the same consequences (Guglielmo et al. 2009). (Other work on the so-called “side-effect effect,” however, suggests that individuals who cause *foreseeable* harm, even unintentionally, are still considered blameworthy; see Knobe, 2003). Moreover,

recognizing harmful events as the result of intentional action is a highly motivating cue for ameliorative action (Cushman 2008); at the same time, people tend to treat acts of omission (e.g., failing to reduce emissions) as less morally repugnant than they do acts of commission (e.g., actively harming someone), at least with respect to the treatment of out-group members (e.g., people living far away in time or space; Baron in press, see also Kurzban, DeScioli and O'Brien 2007). Additionally, recent research finds that individuals feel guiltier about climate change (and subsequently want to do more to combat it) after reading that it is anthropogenic rather than naturally occurring (Ferguson and Branscombe 2010). Markowitz and Shariff (2012) review these and other psychological factors that likely act to weaken individuals' moral intuitions about climate change, concluding that various features of the issue itself (e.g., uncertain outcomes; long time horizons) pose significant challenges to the human moral judgment system. Given these findings, individuals' beliefs about both the causes of climate change (e.g., whether it is purely anthropogenic, purely a natural phenomenon, or some mix of the two) as well as its consequences (e.g., harm to poor individuals or other species) may play an important role in shaping both perceptions of moral obligation to respond and subsequent intentions to actually change one's behavior.

Present research

The findings discussed above suggest that there may indeed, as Jamieson has argued, be good reason to expect that many non-experts simply do not perceive climate change in ethical terms; moreover, moral judgments about the issue likely play an important role in motivating (or demotivating, in their absence) ameliorative behavior (cf., Shwom et al. 2010). Indeed, in some of the only empirical research to examine this

question, Leiserowitz, Maibach and Roser-Renouf (2009) found that between 15-30% of Americans surveyed indicated that moral considerations were a motivating factor in their performance of various energy saving actions (depending on the behavior); somewhat more indirectly, public polling data consistently reveals relatively strong support for climate change mitigation policies aimed at improving corporate behavior but weak support for policies that hurt individuals' pocketbooks directly (e.g., gas taxes; Leiserowitz et al. 2009), pointing, perhaps, to the weakness or absence of moral resolve regarding the problem. Despite this and some other recent work (e.g., Butler 2010; Shwom et al. 2010), it appears that very little research has empirically examined the extent to which non-experts perceive climate change as an ethical issue, nor what the etiology and implications of such beliefs might be. In an effort to begin filling in this critical gap, I conducted two studies with undergraduate students in the U.S. in which I explicitly explored beliefs about the 'ethics of climate change.' In the remainder of this chapter I briefly report the results of this research.

Methods

Participants and procedure

Study 1 was conducted between January and March, 2010 and Study 2 was conducted between March and June, 2011. Participants were undergraduate students attending a mid-sized public university in the Northwestern U.S.; Study 1 had 606 participants and Study 2 had 316 participants. Participants in both studies were enrolled in introductory Psychology courses at the time, but were not all Psychology majors. Both samples over-represented females (58% in Study 1, 64% in Study 2) and were predominately white/Caucasian (78% and 75% respectively) and young (mean age = 20

in both samples). Clearly, the data reported on below are not representative of the general U.S. public. Thus, making generalizations from the present samples to other populations regarding the prevalence of various climate change beliefs (e.g., morality beliefs) would be inappropriate. However, this research was primarily intended to provide initial empirical insights into the etiology and implications of beliefs non-experts hold regarding climate change as a moral imperative; that is to say, the focus of the research presented below is on why participants either do or do not identify climate change as an ethical issue and how such beliefs relate to other constructs of interest, e.g., behavioral intentions. It seems reasonable to suggest that the manner in which such beliefs relate to one another should be relatively robust across different subpopulations (including college students); regardless, readers should keep in mind the population being studied when interpreting results.

The measures used in the present studies were embedded within larger omnibus surveys that the participants took via the internet, under no time constraints. All measures relevant to the present research were presented in a single block to participants; however, the location of the block within the broader omnibus survey was fully randomized across participants. Other constructs measured in the Study 1 omnibus survey included: Big Five personality; numeracy; maximizing; betrayal emotion and appraisal; perspective taking; need for cognition and closure; and, various other social psychological measures. The Study 2 survey also included measures of: general social attitudes; self-other overlap; betrayal trauma; and subjective well-being. On average, students spent 45 minutes filling out the survey in Study 1 and 32 minutes in Study 2; given the length of the omnibus

surveys, participants who took less than 15 minutes to complete either survey were eliminated from analyses presented below.

Materials

Across both studies, participants were asked a variety of questions regarding their beliefs about climate change. Table 2.1 shows question wording and response categories of items discussed in the analyses below. Beliefs about the ethical dimensions of climate change were measured using two items in Study 1, including one open-ended item that asked participants to explain why they had said that climate change either was or was not an ethical/moral issue. Responses to the open-ended question were coded (see below). In Study 2, participants were also asked whether they felt a ‘moral obligation’ to respond to the issue; in addition, Study 2 participants responded to a five-item environmental behavior intentions scale ($\alpha = .89$). Political ideology was assessed with a single item that asked participants to self-identify as conservative, moderate or liberal. Additionally, participants were asked basic demographic data (age, gender, ethnicity).

Study 1 results and discussion

The primary aims of Study 1 were to: a) identify the proportion of respondents who believed climate change to be an ethical issue or not; b) explore participants’ open-ended responses explaining their ‘ethics’ responses in order to develop a clearer understanding of the moral reasoning underlying such beliefs; and c) preliminarily examine relations between ‘climate ethics’ beliefs and other constructs (e.g., concern, efficacy). Participants ($n = 592$) responded to the question, ‘Do you consider “climate change” to be an ethical or moral issue?’ Forty-two percent of the students responded affirmatively (referred to as ‘ethicists’), 23% said ‘no’ (‘non-ethicists’), and 36% said

Table 2.1.
Shows Item Wording and Response Categories for Measures Used in Studies 1 & 2

| Domain | Question | Response Categories | Study 1 | Study 2 |
|--|--|--|---------|---------|
| <i>Ethics</i> | Do you consider 'climate change' to be an ethical or moral issue? | Yes; No; Not sure | X | X |
| | Please explain your answer. | Open-ended | X | X |
| | Do you personally feel a moral obligation to respond to climate change? | Not at all; A little bit; Somewhat; Very much | | X |
| <i>Certainty</i> | Do you feel personal responsibility for dealing with climate change? | Not at all; A little bit; Somewhat; Definitely | X | |
| | How sure are you that climate change (global warming) is already taking place? | Not at all ; A little; Somewhat ; Very | X | |
| | Do you think that climate change is happening? | Yes; No; Don't know | | X |
| <i>Causes</i> | Assuming climate change is happening, do you think it is... Caused mostly by humans; Caused mostly by natural changes in the environment; Caused by both human activities and natural changes; None of the above because climate change isn't happening | (see left) | | X |
| <i>Efficacy</i> | How much influence do you think you personally can have on limiting climate change? | None; Some; A little; Large | X | |
| | The actions of a single individual, including myself, won't make any difference in climate change | Strongly disagree; Somewhat disagree; Unsure; Somewhat agree; Strongly agree | | X |
| <i>Risk</i> | How much of a risk do you feel global warming poses to you personally? | Very little (1) to A lot of risk (7) | X | |
| | How much do you think climate change will harm people living in poor countries, either now or in the future? | Not at all; Only a little; A moderate amount; A lot; Extremely | | X |
| <i>Concern (3 items)</i> | How important is the issue of global warming to you personally? If nothing is done to reduce global warming, how serious of a problem do you think it will be? How concerned are you about the possible effects of global warming? | Not at all; Not too; Somewhat; Very; Extremely | X | |
| <i>Affect</i> | How strongly do you feel each of the following emotions when you think about the issue of climate change? Worry; Guilt | Not at all; A little bit; Somewhat; Very | | X |
| <i>Scientific Consensus</i> | To what extent do environmental scientists agree among themselves about the existence and causes of global warming? | No agreement at all (1) to Near complete agreement (5) | X | |
| <i>Behavioral Intentions (5 items)</i> | I intend to... use only recyclable and reusable products from now on; join and provide financial support to pro-environmental organizations in the near future; actively rally for policies that are good for the environment; cut down on using electricity and driving by at least 50%; devote more money to purchase products that are environmentally friendly | Strongly disagree (1) to Strongly agree (9) | | X |

they were unsure either way ('unsures'). Among those participants who were somewhat or very sure that climate change is occurring (80% of the sample), 48% believed it was an ethical issue, 18% said it was not and 34% were unsure. These initial results suggest that, unlike many other hot-button social issues (e.g., capital punishment; abortion), individuals may lack clear moral intuitions regarding climate change, as predicted.

I next examined participants' open-ended responses explaining their perceptions of climate change as an ethical issue (or not); 475 responses were coded. To do so in a systematic manner, I first developed three content-driven coding schemes, one for each of the three groups of respondents³. Next, I trained two research assistants blind to the overarching aims of the research project on the use of the coding schemes. After a training period, inter-rater agreement stabilized around 73% across the three sets of responses. Disagreements were resolved by the author⁴. Further details regarding the coding process and instructions provided to coders are described in Appendix A.

'Ethicists' provided four substantive response types as explanation: 1) humans have a positive stewardship duty and should protect others (including future persons and other species) from the harms of climate change (33.8% of all responses); 2) climate change is anthropogenic (20.4%); 3) climate change will cause harm to others (without explicit indication of duty to protect those others; 19%); and, 4) humans can do something about climate (references to efficacy; 6.5%). The remaining respondents either restated their belief that climate change represents a moral issue or else provided uncodeable or idiosyncratic responses.

Unsurprisingly, responses were extremely different among 'non-ethicists.' This group also demonstrated four substantive categories of response: 1) climate change is an

environmental, scientific or technical problem (20% of respondents); 2) it is a naturally occurring phenomenon (16.4%); 3) humans cannot do anything about the problem (references to inefficacy; 10.9%); and, 4) climate change is simply not happening (9.1%). Additionally, a full 12% of respondents simply restated their response to the ‘ethics’ item and 5.5% said they “didn’t care” about the issue. Finally, among participants who were unsure regarding the ethical nature of climate change (‘unsures’), a full 27.5% indicated that they lacked enough knowledge to make up their minds, 5.4% were unsure about the causal nature of the issue (e.g., anthropogenic vs. naturally occurring) and more than half simply provided an uncodeable or blank response to the follow-up question.

In order to further explore the implications of ‘climate change ethics’ beliefs in this first sample, I next turned to the other measures listed in Table 2.1 and examined how each of these constructs (e.g., concern, perceived efficacy) related to ‘ethics’ beliefs. As shown in Table 2.2, compared to ‘non-ethicists’ and ‘unsures,’ ‘ethicists’ reported significantly higher levels of concern over climate change, greater risk perceptions, and stronger perceptions of scientific consensus on the issue. Importantly, when looking at conservatives, liberals and moderates separately (results not shown), all of these group differences (e.g., ‘ethicists’ vs. ‘non-ethicists’) were in the predicted direction (and nearly all were statistically significant). In addition, ‘ethicists’ perceived themselves to possess greater efficacy to do something about climate change than non-ethicists and similarly were more likely to ascribe personal responsibility to themselves than were participants who did not clearly identify the issue as an ethical one.

The results of Study 1 suggest that believing climate change to be an ethical issue is closely associated with the general perception that the issue is a serious problem in

need of ameliorative action. More specifically, ‘ethicists’ appeared to make connections among the etiology of the problem (it is human caused), humans’ responsibility to protect others from harm (stewardship), and personal ascriptions of responsibility. Thus, this group of respondents appeared to focus both on the causal structure of the problem as well as on downstream consequences. In contrast, ‘non-ethicists’ appeared to focus their attention almost exclusively on the causes and nature of climate change and not very much, if at all, on its downstream implications; it is also of interest to note that relatively few ‘ethicists’ (less than 10%) explicitly stated that climate change simply was not happening (perhaps unsurprising given the make up of the population from which the sample was drawn). Taken together, these results point to the potentially critical role that beliefs about the causes of climate change play in shaping moral judgments, perceptions of moral obligation and subsequent motivation to take action on the issue. I explore these possibilities in more detail in Study 2.

Table 2.2.

Shows Mean Scores of ‘Ethicists’ (n = 131), ‘Non-Ethicists’ (n = 242), and ‘Unsure’ (n = 204) in Study 1 on Five Domains of Climate Change Belief. All F Tests Have df = 2, 574. Last Two Columns Show Results of Post-Hoc Pairwise Comparisons Using Bonferroni Corrections: Concern and Scientific Consensus Were Measured Using 5-pt Scales, Risk Perceptions With a 7-pt Scale, and Efficacy and Responsibility With 4-pt Scales.

| Measure | Ethicists (1) | Non-ethicists (2) | Unsure (3) | F | p | 1 vs. 2 | 1 vs. 3 |
|----------------|------------------|----------------------|---------------|--------|-------|---------|---------|
| Concern | 3.89 | 2.62 | 3.29 | 102.52 | <.001 | * | * |
| Risk | 4.37 | 2.70 | 3.88 | 51.68 | <.001 | * | * |
| Consensus | 3.74 | 3.02 | 3.17 | 26.83 | <.001 | * | * |
| Efficacy | 2.57 | 1.89 | 2.25 | 34.67 | <.001 | * | * |
| Responsibility | 2.68 | 1.73 | 1.99 | 69.41 | <.001 | * | * |

* Indicates a significant pairwise difference.

Study 2 results and discussion

The results of Study 1 raise a number of important and interesting questions: Are responses to the ‘ethics’ question simply a proxy for beliefs regarding either (or both) the causes of or the potential harms caused by climate change? How are perceptions of moral obligation to respond in the face of climate change affected by beliefs about the causal structure of the problem? Do such ‘etiology’ beliefs affect intentions to respond behaviorally to the problem, and if so, is this effect mediated by perceptions of moral obligation or efficacy? Moreover, is there a difference (e.g., in perceptions of obligation and efficacy) between people who believe climate change is exclusively anthropogenic and those who see both human and natural forces at work? Study 2 was designed to provide at least initial answers to these questions.

As in Study 1, participants in Study 2 disagreed with one another regarding the ethical nature of climate change: 51% were ‘ethicists,’ 29% were ‘non-ethicists’ and 20% were ‘unsures.’ Moreover, while the vast majority of participants believed climate change was happening (85%), there was significant variation among these respondents regarding beliefs about the causes of climate change: 34% believed that the problem is exclusively caused by human actions, 61% believed that both humans and natural variation are causing it, and 5% said that climate change is a naturally occurring phenomenon with no anthropogenic contribution. These numbers highlight significant differences in opinion between the population sampled and the general U.S. public, among whom 45-50% believe climate change to be primarily anthropogenic and 30-35% believe it to be naturally occurring (see Leiserowitz et al. 2011).

To begin answering the questions raised by Study 1, I first examined the distribution of responses to the ‘ethics’ item as a function of ‘causation’ beliefs. (In these and all subsequent analyses described below, I included only those individuals who said that climate change is indeed happening). As expected, among the few individuals ($n = 14$) who stated that climate change is a naturally occurring phenomenon, 64% responded ‘no’ to the ethics item (14% said yes, 21% said ‘unsure’); in contrast, only 14% of participants who believed climate change to be exclusively anthropogenic (total $n = 87$) were ‘non-ethicists.’ Perhaps more interestingly, compared to the ‘anthropogenic’ group, twice as many individuals who viewed climate change as both anthropogenic and natural (‘mixed causation’ group; total $n = 163$) were ‘non-ethicists’ (28%).

These initial results suggest that simply holding the belief that climate change is not exclusively anthropogenic (let alone exclusively natural) might be related to understanding the issue in fundamentally different terms with respect to considerations of morality. Because the ‘naturally caused’ group was so small in this sample, I focused the remainder of my analysis on comparisons between the ‘anthropogenic’ and ‘mixed causation’ groups.

Further supporting the contention that the ‘anthropogenic’ and ‘mixed causation’ groups perceived the moral implications of climate change differently, the former group reported stronger perceptions of personal moral obligation to respond than did the latter group, $t(248) = 2.4$, $p = .02$, $d = .32^5$; individuals in the ‘anthropogenic’ group also reported feeling significantly more guilty when thinking about climate change, $t(249) = 2.5$, $p = .01$, $d = .33$. One plausible explanation for these findings could be differences between the two groups with respect to perceptions of harm caused to innocent others

(e.g., poor individuals, future generations), although it is unclear exactly why beliefs about the etiology of the problem would affect perceptions of harm. However, although the ‘anthropogenic’ group did have a higher mean score on the harm item than the ‘mixed causation’ group, the effect was only marginally significant by traditional standards, $t(248) = 1.8, p = .07$. Moreover, the two groups did not differ significantly in terms of perceived personal self-efficacy to address climate change, $t(251) = 1.5, p = .13$.

Further analysis revealed that individuals in the ‘anthropogenic’ group reported stronger intentions to perform pro-environmental actions than did ‘mixed causation’ individuals, $t(251) = 2.1, p = .04, d = .28$, and across both groups there was a moderate-to-strong correlation between ascriptions of personal moral obligation and intentions to perform pro-environment acts, $r(250) = .47, p < .001^6$. These findings suggest that understanding climate change to be caused primarily or exclusively by humans may increase intentions to respond by increasing feelings of moral obligation, apart from considerations of harm or efficacy.

To test this proposition formally, I conducted a mediation analysis using Preacher and Hayes’ (2008) bootstrapping method (with 5000 resamples), which generates a data driven sampling distribution that can be used to robustly estimate the statistical significance of the indirect effect. As suggested by the pattern of results presented above, the 95 percent confidence interval for the indirect effect of causation beliefs (anthropogenic vs. mixed) on behavioral intentions via perceptions of moral obligation did not include zero (CI95 = .05, .50), indicating the existence of a robust and significant mediation effect, as predicted (point estimate = .23, Sobel $z = 2.25, p = .02$). After accounting for perceptions of moral obligation, the direct effect of causation beliefs on

environmental intentions was no longer significant (see Figure 2.1). (It must be noted that in theory the causal pathway could be reversed, i.e., moral obligation predicts etiology beliefs; the observational nature of the data do not allow us to conclusively determine which variable is the mediator and which is the more distal independent variable; see below for further discussion.)

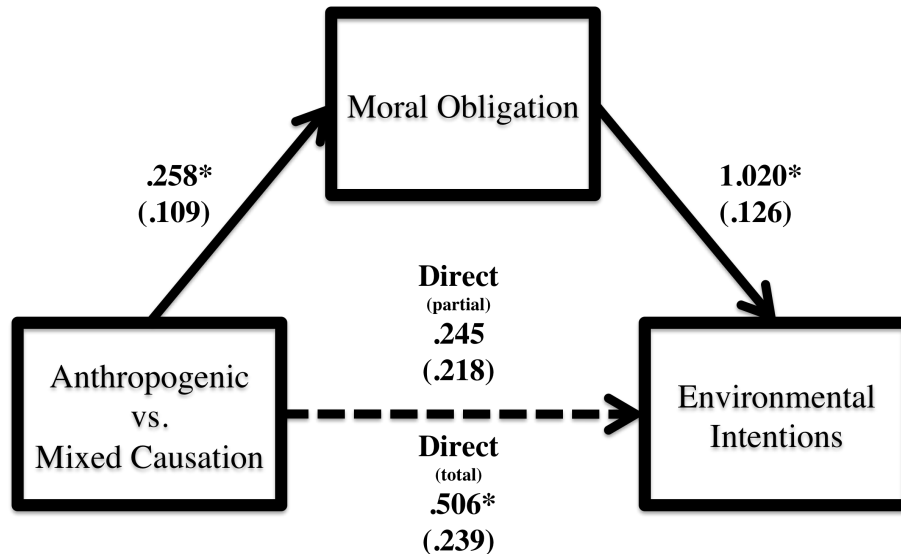


Figure 2.1. Presents results of a mediation analysis showing that the effect of causation beliefs on environmental behavior intentions is fully mediated by perceptions of moral obligation; note that the significant direct path between causation beliefs and behavioral intentions becomes non-significant once moral obligation is entered into the regression equation; unstandardized regression coefficients are shown with standard errors in parentheses; * indicates a significant path, $p < .05$

Further explicating the initial results from Study 1, these findings suggest that individuals' perceptions of climate change as a moral issue, and subsequent feelings of moral obligation to respond (and intentions to do so), are significantly related to beliefs about the etiology of the issue and the role not only of humans but also natural variation in shaping our changing climate. Although the results above (and particularly the mediation analysis) should be treated with caution given their correlational nature and the

restricted population sampled (see below), they appear to fall closely in line with other recent experimental research which shows that individuals who are exposed to messages blaming humans for causing the problem (as opposed to it being naturally occurring) report greater feelings of guilt, which in turn mediate stronger intentions to act in the interests of the environment (Ferguson and Branscombe 2010). Moreover, Study 2 results appear to fit nicely with past findings highlighting the central role of agency and intentionality in judgments of morality (Cushman 2008; Guglielmo et al. 2009).

General discussion

Although it is important to keep in mind that the empirical results presented above reflect the beliefs of a very specific subgroup of the American public (i.e., college students), the findings hold important implications for both the study of climate change ethics and the use of morality and ethics frames (Nisbet 2009) for communicating about climate change. Specifically, the present research suggests that while many individuals do believe that climate change poses an ‘ethical problem’ (Jamieson 2007), there may be just as many if not more who are either unsure or who do not believe the issue falls under the domain of moral consideration. What is more, the results of two studies reveal that moral judgments regarding climate change cannot simply be explained by an individual’s belief regarding the existence of climate change. Rather, a majority of the roughly 20% of participants who fell into the ‘non-ethicists’ group appeared to hold that position in significant part due to a belief that climate change is not anthropogenic; moreover, significant differences between those who view climate change as anthropogenic and those who understand it to be a result of both human and natural forces arose with respect to perceptions of moral obligation, and subsequent intentions to act on those obligations,

despite similar levels of perceived harm and efficacy. This latter result suggests that individuals may be particularly sensitive to, and perhaps overly oriented towards, the etiology of the problem as opposed to the downstream consequences that climate change poses for many communities and non-human species.

The present findings appear to fit well with recent research demonstrating a causal relationship between perceived causes of climate change, moral emotions (e.g., guilt), and motivation to respond behaviorally (Ferguson and Branscombe 2010) as well as with the rapidly growing literature on moral intuition and judgment (Haidt 2007). Moreover, the results provide some support for Jamieson's (2007) contention that we do not see climate change as a 'paradigm[atic] moral problem,' one which motivates immediate and decisive action. They also suggest that the situation may be even worse than Gardiner (2006) assumes, because it may not be the case that most (or even very many) non-experts and non-philosophers understand climate change in ethical terms (much less that they fall prey to 'moral corruption'). At the same time, it seems important not to lose sight of the fact that the largest subgroup (with respect to 'climate ethics' beliefs) in the present samples did indeed consist of individuals who responded affirmatively to the ethics question. Moreover, many of the open-ended responses provided by the participants in Study 1 belied deeply rooted and powerfully felt moral intuitions regarding climate change.

Perhaps more substantively, the results of Study 2 in particular suggest that individuals who identify climate change as a moral imperative also demonstrate a greater willingness to engage in a positive manner with the issue—emotionally, cognitively and perhaps behaviorally—than those who do not understand the issue in ethical terms. This

remains the case even when we take into account group differences in perceptions of harm and self-efficacy (which are also known motivators of prosocial behavior under some conditions, cf., Capara, Alessandri and Eisenberg 2012). Put slightly differently, these results indicate that individuals' expressions of their altruistic tendencies are shaped by perceptions of an issue as morally relevant or not. To the extent that these results generalize to the broader population (which remains to be seen given the aforementioned differences between college students and the general public with regards to climate change causation beliefs), this finding potentially holds important implications for our broader understanding of the underlying drivers of prosocial action in situations that theoretically should push individuals to act selfishly.

Additionally, these results would seem to be good news for those climate change advocates who have tried to use morality frames to communicate about climate change with traditionally unreceptive segments of the population (e.g., attempts to increase concern among Evangelical Christians in the U.S. by framing the issue as one about stewardship and personal responsibility; see, e.g., Wardekker, Petersen and van der Sluijs 2009). Even more encouraging in this respect, perhaps, is the fact that morality beliefs in the climate context do not seem to be completely wrapped up in (that is to say, confounded with) the public 'debate' over the very existence of climate change; on the other hand, given the present results, the widespread belief among the U.S. public (and others) that climate change is a result of natural forces (Leiserowitz et al. 2011) suggests a potentially significant barrier to recognition of the issue as a moral imperative. Finding ways to effectively communicate the 'moral position' on climate change with individuals who currently believe climate change is happening but who do not see it as an ethical

issue may indeed have significant impacts on those people's other beliefs about the issue, and perhaps even their willingness and eagerness to confront the issue in meaningful ways.

Limitations and future directions

The present research is limited in a number of respects, first, and most obviously, by the use of convenience samples. Future research should continue to explore beliefs about the ethical dimensions of climate change among representative samples of the general public. Of course, this work should be cross-cultural, as there may very well be significant differences between nations (and certainly between groups within nations) with respect to how and why individuals understand climate change as a moral imperative (or not). At the most basic level, this research should establish the extent to which members of the general public(s) do or do not view climate change in ethical terms. Moving forward, it will also be critical to utilize experimental designs that allow researchers to examine the relative efficacy of climate change messages that use or do not use morality frames, or that use different types of morality frames (see Feinberg and Willer in press). Only carefully designed experimental or quasi-experimental designs will allow us to determine the extent to which 'ethics' beliefs are indeed predictive of, and not simply coexistent with, concern over climate change, feelings of responsibility and efficacy and, ultimately, willingness to engage in greenhouse gas-reducing actions (including political ones, e.g., 'green' voting).

Additionally, the research reported here is limited by the measures I used in this particular study. Future research should attempt to employ even more robust measures, especially with respect to the most critical constructs. For example, although both the

open-ended item as well as some of the close-ended questions included in Study 2 provide some insights into what the terms ‘ethical’ and ‘moral’ meant to my participants, future research would do well to more thoroughly examine how different individuals (and perhaps groups) understand and use those terms. In addition, asking participants to classify a number of different social and environmental issues as moral or not would help contextualize responses regarding any one issue. It seems clear that we should be able to delve more deeply into the nuances of individuals’ beliefs in this domain without having to lose the robustness and potential for representative coverage of study populations gained by use of wide scale survey and public polling methodologies. Indeed, one of the strengths of the present research is that the findings reflect the thoughts and feelings of over 900 individuals, albeit individuals from a very specific subpopulation. There is clearly also a need for focus group and in-depth interviewing on this topic (e.g., Butler 2010; Stoll-Kleemann et al. 2001), as these methods can provide rich narratives and deep insights into individuals’ beliefs. At the same time, such methods provide a fundamentally different, and complementary, perspective relative to large-scale survey research methods.

Future research should also seek to further exploit recent insights coming out of the fields of moral, political and social psychologies in order to both better explicate the etiology of ‘climate ethics’ beliefs as well as, and perhaps more importantly, to uncover barriers to and facilitators of understanding climate change as a moral imperative. Just as the research on perceptions of intentionality can perhaps help us to explain some of the present results, other recent theories and findings are already being used to explain and predict other, related aspects of non-experts’ climate change (moral) belief systems (cf.,

Feinberg and Willer 2011; Feygina, Jost and Goldsmith 2009; Markowitz and Shariff 2012).

Two other closely related points should be noted. I have argued throughout this paper that ‘etiology beliefs’ and ‘morality beliefs’ are distinct, yet related, constructs; moreover, I have also proposed a specific causal relationship between the two constructs (i.e., beliefs about the causes of climate change shape morality beliefs, including perceptions of moral obligation). However, it is important to note that both of these assertions could be challenged, particularly on empirical grounds. First, it is possible that the measures of morality beliefs and etiology beliefs used in these studies are simply different measures of the same underlying latent construct; for example, stating that climate change is anthropogenic and that it is a moral issue (or that one has a moral obligation to respond) may just reflect one’s underlying beliefs about the harms caused by climate change. However, the fact that perceptions of harm did not differ significantly between the ‘anthropogenic’ and ‘mixed causation’ groups, whereas moral obligation did, would seem to argue against this interpretation; moreover, from a theoretical perspective, morality beliefs appear to be broader in scope than etiology beliefs, and there is only partial overlap between the two constructs.

Second, as indicated above, it is plausible that the direction of causality between these two constructs is reversed from the one assumed throughout this paper. For example, people may first develop the belief that climate change either is or is not a moral issue and then shape their understanding of the causes of the phenomenon to fit and support those preexisting beliefs (this may especially be the case among people who want to deny or avoid personal culpability); such ‘motivated moral reasoning’ is a well-

documented and regular occurrence in daily life (see Ditto, Pizarro and Tannenbaum 2009; Kunda 1990). However, it seems likely that the considerably more common “causal story” to which people are exposed (e.g., via mass media) regarding climate change as a moral issue involves climate change being described as moral in part because it is caused by humans, not that it is caused by humans because it is a moral issue. To the extent that individuals develop beliefs about climate change primarily as a result of exposure to mass media coverage of the topic, then, the original proposed causal relationship seems reasonable.

Finally, there are important aspects of this general topic that I have almost entirely ignored in the present paper, and these should be addressed in future work. Foremost amongst these are the intertwined issues of environmental justice, racism and sustainability. A key component of much messaging on climate change is the issue of harm to future generations caused by our greenhouse gas emitting behaviors performed now. Much less prevalent, but just as important, are questions of climate justice in the here-and-now. The open-ended responses of ‘ethicists’ described briefly above suggest that to the extent that justice issues are present in people’s minds, these concerns are predominantly focused on intergenerational considerations (which seems to indicate that they are tracking how the issue is often portrayed in the media). Various researchers are actively engaged in expanding the universe of ethical concerns in the climate change context (e.g., Moore and Nelson 2010; Singer 2006), and it will be important to explore the public’s beliefs about all dimensions of the ‘ethics of climate change.’

Conclusion

The present research examined non-experts' beliefs about climate change and morality. The findings provide novel insights into how a relatively large group of individuals thinks about the ethical dimensions of global climate change, showing that self-ascriptions of moral obligation and intentions to perform ameliorative actions are related in important ways to how individuals understand the causes of the phenomenon. This work builds off of and, I think, begins to expand the extant literature on the ethical dimensions of climate change. While moral philosophical treatises laying out well-reasoned arguments in favor of recognizing climate change as a moral imperative are clearly important (especially, I think, in motivating and guiding policymaking), it is clear that non-experts' beliefs about all aspects of the climate issue, including ethics, are key ultimate drivers of public policy (Bord, Fisher and O'Connor 1998; Krosnick, Holbrook, Lowe and Visser 2006). Understanding how, why and to what extent members of the general public think about and respond to climate change as an ethical issue, and not solely as an environmental, scientific, technological or physical one, can only improve our chances of finding meaningful and (politically) workable solutions moving forward.

Bridge to Chapter III

As discussed in Chapter I (*Introduction*), this dissertation examines how psychological and cultural processes related to morality and emotion shape individuals' engagement with environmental issues, particularly those with long time-horizons and impacts that disproportionately affect future others (climate change being a paradigmatic example). In Chapter II, I have shown clearly that individuals living in contemporary America have difficulty perceiving climate change as a morally relevant issue, and that

this difficulty has potentially critical implications for our individual and collective willingness to confront this “super wicked problem” (Lazarus, 2009). Furthermore, in the present chapter I have examined one factor that shapes our perceptions of morality in the climate change domain, i.e., beliefs about the causal structure of the problem. In Chapter III, I build directly upon this initial work by examining in more detail underlying psychological and contextual mechanisms that shape one core feature of the moral domain in the context of such intergenerational environmental problems, i.e., perceptions of responsibility towards future generations. Specifically, I explore the role that feelings of gratitude and perceptions of fairness play in motivating the belief that one has personal responsibilities and duties to act on behalf of future others, both within and beyond the context of global climate change; moreover, I examine the extent to which gratitude, indebtedness and fairness uniquely predict individuals’ willingness to engage in personally costly actions on behalf of future generations. Chapter III thus broadens the scope but also the specificity of the research presented in Chapter II.

Notes

1. I use the term ‘understand’ to broadly include not only highly reasoned, cognitive mental representations but affective reactions as well.
2. Of course, there are certainly other grounds besides moral ones for justifying climate change mitigation and adaptation efforts, including self-preservation/national defense, economic opportunity and generating positive affect (e.g., ‘warm glow’).
3. Different coding schemes were necessary for the three groups given the nearly non-overlapping nature and content of the responses provided by respondents.

4. Secondary analyses confirmed that the substantive results of the open-ended coding were unaffected by my involvement in resolution of inter-coder disagreements.

5. This is considered a small-to-moderate effect size.

6. This correlation is attenuated by the exclusion of the rest of the sample; with all participants included, which is reasonable given that one does not need to believe climate change is happening or anthropogenic to meaningfully respond to either of the two items in question, the correlation is even stronger, $r(312) = .50, p < .001$.

CHAPTER III

WHO CARES ABOUT THE FUTURE? THOSE WHO FEEL

GRATEFUL TOWARDS THE PAST

“If future generations are to remember us more with gratitude than sorrow...we must leave them a glimpse of the world as it was created, not just as it looked when we got through with it.” –Lyndon B. Johnson

“People will not look forward to posterity, who never look backward to their ancestors.” -Edmund Burke

Gratitude has been referred to as “the moral memory of mankind” (Simmel, 1908/1996). In recent years, both the experience and expression of gratitude (see below) have been implicated in promoting well-being and health (e.g., Emmons & McCullough, 2003), relationship formation and social integration (e.g., Algoe, Haidt, & Gable, 2008; Froh, Bono, & Emmons, 2010), and prosocial behavior both within and beyond the context of reciprocal exchange (Bartlett & DeSteno, 2006; Trivers, 1971; Tsang, 2006a). Nowak and Roch (2007) have suggested that the evolution of gratitude within social groups promotes cooperation and reduces the costs of altruism between strangers, and DeSteno, Bartlett, Baumann, Williams, and Dickens (2010) recently demonstrated in a lab setting that incidental experiences of gratitude increase cooperation with unrelated others even at significant personal (economic) cost.

The present research puts Simmel’s (1908/1996) proposition to the test by asking whether gratitude promotes prosocial behavior and cooperation not only with contemporaries (with whom future interaction can be expected), but also across generations. Building off of recent and classic work in moral philosophy (cf., McConnell, 1993), sociology (cf., Komter, 2004), evolutionary biology (cf., Trivers, 1971) and social psychology (cf., Bartlett & DeSteno, 2006; McCullough, Emmons, & Tsang, 2002), I explore the role that gratitude plays in motivating concern for and beneficent behavior on

behalf of future generations, particularly within the context of environmental collective action problems (e.g., climate change; resource conservation). I conceptualize gratitude both as a relatively stable individual differences factor and as a situationally-induced reaction to reminders of benefits received (see below). Across three studies, I show that individuals who feel more grateful towards past generations and those who are dispositionally grateful demonstrate greater levels of intergenerational concern and care.

Past research on intergenerational responsibility and decision-making

Extant research on the factors that shape our interactions with future generations spans many disciplines. Much, if not most, of this work builds off of the assumption that intergenerational problems, such as climate change, arise in large part because the interests of present and future generations are often misaligned, particularly with respect to the consumption of finite resources and production of long-lasting burdens (e.g., pollution, debt). As Gardiner (2006) has put it, intergenerational issues are fundamentally collective action problems in which each generation has a powerful incentive to use as many common resources as it can (Ostrom, 2000).

Philosophers have had much to say regarding what is owed to future generations (e.g., a viable planet; *Our Common Future*, 1987), who holds future-oriented responsibilities (e.g., individuals vs. groups; e.g., Hourdequin, 2010; Sinnott-Armstrong, 2005), and where responsibility and duty towards posterity come from (e.g., considerations of justice; see Tremmel, 2006). Many economists similarly take a normative approach when they attempt to determine both what actions should be taken to produce the most “efficient” distribution of resources across generations and who should bear which costs (see, e.g., Nordhaus, 2007; Portney & Weyant, 1999; Stern, 2006).

Descriptive approaches to understanding intergenerational decision-making¹ have also been prominent. Within anthropology, sociology, and political science, research has examined factors that affect how present and past generations actually *do* interact with

future generations. For example, cross-cultural anthropological and sociological research suggests that cultures differ in terms of their conceptualization of and relationship to time (e.g., Hall & Hall, 1990; Jones, 1988; Sadri & Flammia, 2011), which in turn may impact how different cultures navigate decisions that involve present-future tradeoffs (e.g., decisions regarding environmental protection). In a related vein, socio-linguistic work by Chen (under review) finds that aspects of the language one speaks shape both individual- and country-level future-oriented decision-making; individuals (and groups) whose primary language does not make a grammatical distinction between present and future events (e.g., Mandarin, German) tend to engage in more future-oriented behavior.

Past psychological research on intergenerational decision-making

Among psychologists, there has been considerable interest in uncovering proximal cognitive, affective and social mechanisms that shape both intergenerational decision-making and, to a lesser extent, perceptions of responsibility towards the future. Research on time perspective (cf., Zimbardo & Boyd, 1999), future orientation² (Strathman, Gleicher, Boninger, & Edwards, 1994) and generativity (Erikson, 1950; McAdams & de St. Aubin, 1992) reveals that individual differences in the predisposition to consider the future consequences of present decisions hold important implications not only for decision-making relevant to the self (e.g., engaging in risky behavior; Keough, Zimbardo, & Boyd, 1999) but also for decisions that affect the well-being of others, including future generations. For example, Dietz, Dan and Shwom (2007) found that future orientation is a strong predictor of support for ameliorative climate change policies and Strathman et al. (1994) found a positive relationship between future orientation and performance of pro-environmental actions (see also Joireman, van Lange, & van Vugt, 2004; Milfont & Gouveia, 2006). Urien and Kilbourne (2011) recently reported a positive relationship between generativity concerns and pro-environmental behavior, indicating

that perceptions of responsibility towards future others increase willingness to take ameliorative environmental action on their behalf (see also Milfont & Sibley, 2011).

Research has also examined the role of numerous other constructs that potentially shape our interactions with future generations. Considerations of harm and justice, for example, have been shown to motivate concern for and action on behalf of future generations (e.g., O'Connor, Bord, & Fisher, 1999); in this vein, Opatow (1994) demonstrated a positive relationship between individuals' scope of justice (i.e., the universe of individuals and groups a person perceives as having moral standing) and pro-environmental action. Other research finds that having people think about future Americans as part of their ingroup increases concern for those future others (Ferguson & Branscombe, in preparation; see also Schultz, 2001 for related work on perspective taking). Given that acting on behalf of future others represents a paradigmatic example of prosocial, altruistic behavior, we can expect that many (although not all) of the factors that have been shown to shape such actions between contemporaries (e.g., empathy, self-efficacy, social value orientation; see Penner, Dovidio, Piliavin, & Schroeder, 2005) similarly affect intergenerational beneficence.

Finally, Wade-Benzoni proposed a model of intergenerational decision-making that implicates a number of interrelated proximal and distal factors (see Wade-Benzoni & Plunkett Tost, 2009). For example, Wade-Benzoni (2009) demonstrated a positive effect of affinity with future generations (a combination of empathy, perspective taking and perceived oneness) and a negative effect of uncertainty regarding the effectiveness of personal sacrifice on intergenerational beneficence. In work directly relevant to the present research, Wade-Benzoni (2002) has found that individuals appear to "reciprocate" the good deeds done to them by past generations by acting altruistically towards future others. I discuss this and related relevant research in detail below.

What is missing?

It is clear that intergenerational decision-making and perceptions of responsibility towards future generations are influenced by a wide variety of factors operating at every level of analysis. These factors, some of which are intrapersonal and many of which are fundamentally social in nature, interact with one another (both at the individual and collective levels) to shape how we interact with future generations (see Buchan, Croson, & Dawes, 2002 and Shen, Wan, & Wyer, 2011). Yet missing in the research briefly described above is a proximal mechanism that is both multi-level in nature (i.e., it operates and exists both intra- and inter-personally) and able to explain why individuals feel responsible for the well-being of future others. As I explain below, I believe the multidisciplinary construct of *gratitude* is an excellent candidate to fill such a role.

What is gratitude?

The concept of gratitude has a rich and varied history in philosophical (cf., Hume, 1888; Seneca, 1935; Smith, 1790/1976), religious (see Schimmel, 2004) and, more recently, social scientific thought (e.g., Gouldner, 1960; Heider, 1958; Simmel, 1908/1996). In both colloquial and professional use, gratitude often refers to a discrete, temporally brief, situationally-aroused positive emotional state that “typically flows from the perception that one has benefited from the costly, intentional, voluntary action of another person” (McCullough, Kimeldorf, & Cohen, 2008, p. 281); I refer to this as “state” or “situational” gratitude. Gratitude also refers to a more stable characteristic of individuals (“trait” gratitude; cf., McCullough et al., 2002; Watkins, Woodward, Stone, & Kolts, 2003; Wood, Maltby, Stewart, & Joseph, 2008). To be a “grateful person” means to be predisposed to experience the emotion of gratitude relatively easily in situations in which one has received benefits as well as to express gratitude towards one’s benefactors. Of course, the term gratitude is also used to refer not to an internally experienced emotion but rather to an other-oriented, expressive act: “to be grateful” or

“to show gratitude” in this sense means to express one’s feelings of gratitude in an explicit manner (e.g., saying “thank you”) or providing material benefits to another person (see Grant & Gino, 2010; Watkins, Scheer, Ovnicek, & Kolts, 2006). This usage of the term clearly fits with both the emotional and dispositional definitions of the construct, but is also notably distinct in its focus on gratitude as an interpersonal *action* rather than reaction or predisposition.

Finally, gratitude is also often referred to as a virtue by philosophers and others (e.g., Aquinas, 1981; Emmons & Mishra, in press; Seneca, 1935; Smith, 1790/1976). Adam Smith believed that gratitude was “the sentiment which most immediately and directly prompts us to reward” (1790/1976, p. 68) and Cicero (1851) wrote that gratitude is “not only the best, but the parent of all other virtues” (p. 139); numerous other ancient and modern philosophers have extolled the virtuous ways of grateful individuals (see Harpham, 2004; McConnell, 1993). Ingratitude, on the other hand, has long been held in the highest contempt by philosophers and religious leaders alike (cf., Hume, 1888; Kant, 1797/1964; see also Schimmel, 2004).

When do we experience gratitude?

People (at least in contemporary American society) tend to feel grateful towards others under a specific set of circumstances. Tesser, Gatewood and Driver (1968) showed that gratitude is sensitive to how costly the benefit was to provide and how much it is valued by the recipient. Building on these earlier insights and more recent empirical findings, Tsang (2006a) and others (cf., Ortony, Clore, & Collins, 1988) have suggested four primary factors that shape whether or not individuals feel grateful after receiving benefits from others: (1) whether the favor is valued by the recipient; (2) how costly the favor is for the benefactor to provide; (3) whether the benefit is given with benevolent intentions; and, (4) whether the favor is given gratuitously rather than as a function of role-based obligations or norms of reciprocity. Although individuals can still feel grateful

when one or more of these conditions fails to hold, their absence can lead to other emotional and cognitive responses to receiving aid as well.

Distinguishing gratitude from indebtedness

Sometimes, people experience negative feelings of indebtedness when they recognize the benefits that others have provided to them. Greenberg (1980) defined indebtedness as “a state of obligation to repay another, which arises from the norm of reciprocity” (p. 200) and which is associated with negative emotions, including discomfort and uneasiness (Tsang, 2006b; Roberts, 2004 adds other related emotions including resentment and guilt). Although gratitude and indebtedness have often been conflated in psychological and other literatures, recent experimental work has consistently shown that the two constructs can be distinguished in their causes and consequences (e.g., Goei & Boster, 2005; Naito & Sakata, 2010; Tsang, 2006b). For example, stronger expectations of return increase indebtedness but decrease gratitude (Watkins et al., 2006); in contrast, the intentions of the benefactor (e.g., benevolent vs. ulterior) affect gratitude but not indebtedness (Tsang, 2006b). More importantly in the present context, gratitude motivates prosociality and approach tendencies (Fredrickson, 2004; see below), whereas feelings of indebtedness tend to promote rigid ‘tit-for-tat’ reciprocal behavior (Greenberg, 1980; see below) and avoidance (much as anticipation of being asked to provide aid reduces empathy, cf., Shaw, Batson, & Todd, 1994).

Why gratitude?

Having defined gratitude as a cognitive and affective construct that most often arises among contemporaries, it is reasonable to ask why we would expect either trait or situational gratitude to relate to concern for and personal willingness to sacrifice on behalf of distant future others. I suggest there are at least two primary reasons why we might expect to find such an effect. First, gratitude—which results from our perceptions of being treated well by others—fosters indirect reciprocal helping behavior (cf., Bartlett

& DeSteno, 2006; Nowak & Roch, 2007; Trivers, 1971); recent research finds that intergenerational beneficence is similarly increased by knowledge of the positive deeds performed on our behalf by past generations (Wade-Benzoni, 2002), suggesting a possible role for gratitude in promoting “intergenerational reciprocity.” Second, gratitude builds social cohesion and capital (cf., Putnam, 2000) by increasing trust (Fredrickson, 2004), supporting the formation of interpersonal bonds (Algoe et al., 2008) and, promoting cooperation among unrelated individuals (DeSteno et al., 2010). One likely outcome of these effects may be that gratitude helps individuals and communities to overcome collective action problems, of which intergenerational issues such as climate change are paradigmatic examples (Gardiner, 2006; Pendergraft, 1998). I expand on these two reasons below before presenting results from three studies.

Gratitude as motivator of (intergenerational) reciprocity

In his classic article outlining the theory of reciprocal altruism, Trivers (1971) argued that gratitude was “selected [by evolution] to regulate human response to altruistic acts” (p. 49)³. Gouldner (1960), writing about the norm of reciprocity, suggested that “gratitude joins forces with the sentiment of rectitude and adds a safety-margin in motivation to conformity” (p. 176). Recent computational modeling work by Nowak and Roch (2007) appears to support both of these claims: they found that gratitude not only can evolve in the context of natural selection but that it may also serve as a motivator of “upstream reciprocity” (reciprocal helping provided not to one’s benefactor but to an unrelated third party). Moreover, results of their modeling indicated that gratitude decreases the costs and increases the efficiency of cooperation among strangers. More recently, McCullough, Kilpatrick, Emmons and Larson (2001) argued that gratitude serves both as a positive reinforcer of beneficent behavior (expressing gratitude towards a benefactor increases motivation to provide further benefits; Grant & Gino, 2010; Moss & Page, 1972) and as a “moral motivator” (see also McCullough et al., 2008). Feeling

grateful is not just a “warm and fuzzy” by-product of being provided aid—it also acts to motivate reciprocal helping behavior (hence Adam Smith’s suggestion that gratitude is the primary motivator of reward, 1790/1976).

Supporting these claims, McCullough et al. (2002) found positive correlations between a measure of dispositional gratitude and self-reports of prosocial behavior as well as with personality traits associated with prosociality (e.g., agreeableness, empathy; see also Saucier & Goldberg, 1998). More recently, Bartlett and DeSteno (2006) showed that experimentally induced gratitude increased subsequent helping behavior directed not only at one’s previous benefactor but also towards unrelated third-parties; the authors suggest that these “indirect reciprocity” effects demonstrate a unique effect of gratitude in motivating prosocial behavior, over and above possible effects of adherence to reciprocity norms or simple positive affect (see also DeSteno et al., 2010; Goei & Boster, 2005; Naito & Sakata, 2010; Tsang, 2006a; Watkins et al., 2006).

Taken together, this body of research indicates a clear role for gratitude as a motivator of prosocial, reciprocal behavior. But how do these findings translate to the intergenerational context, in which reciprocity seems less relevant as a motive for providing aid to others? (After all, non-overlapping future generations by definition cannot reciprocate any good deeds we perform on their behalf nor can they provide benefits in advance.) Some philosophers have argued that reciprocity *is* relevant in the intergenerational case when we consider that the present generation is the recipient of many good deeds performed on its behalf by past generations (e.g., establishment of the national parks; cf., Page, 2006); such benefits cannot be directly repaid (for obvious reasons) but they may be “paid forward” to future generations. Wade-Benzoni (2002) tested this intergenerational reciprocity hypothesis empirically. In a series of four studies, she found that making individuals aware of the benefits they themselves have received as a result of the beneficent actions of past generations increased intergenerational environmental stewardship (Studies 1 and 2) and economic altruism (Studies 3 and 4)⁴.

Wade-Benzoni (2002) framed her findings within the context of previous work on indirect reciprocity and intertemporal discounting and decision-making (cf., Ekeh, 1974; Frederick, Loewenstein, & O'Donoghue, 2002; Levi-Strauss, 1949). She suggested that individuals in her studies transferred benefits to future generations after being reminded of their own receipt of past generations' good deeds as a result of two primary mechanisms: modeling effects (past generations' actions serve as a model of how to behave towards those in the future); and norms of reciprocity (societal norms dictate paying forward benefits received "as a matter of retrospective obligation" p. 1014). However, she did not test these or any other possible mediating mechanisms.

Given the present discussion, three plausible alternative explanations of the observed intergenerational reciprocity effect present themselves. First, individuals may have increased their intergenerational beneficence (e.g., advocating for larger increases in the federal gas tax) due to considerations of fairness: individuals who perceived that they were fairly treated by past generations may have believed that they had a resulting responsibility or duty from justice to reciprocate. In fact, results from Wade-Benzoni's (2002) fourth study appear to provide partial support for the "fairness" hypothesis. After making their intergenerational allocations, participants were asked to what extent they felt fairly treated by the previous generation. Indicating that her manipulation had worked, participants in the "generous previous generation" condition scored higher on the fairness item than did those in the "non-generous" condition. Unfortunately, Wade-Benzoni treated the measure of perceived fairness solely as a manipulation check rather than as a potential mediator and did not report results of any mediation analyses.

A second alternative mechanism, related to the reciprocity norms argument, is indebtedness (see Gouldner, 1960; Greenberg, 1980). Perhaps reminders of past generations' good deeds induced feelings of indebtedness in Wade-Benzoni's (2002) participants, which they were then able to reduce by acting beneficently towards future others. Such an argument would suggest that learning about the good deeds of past

generations leads individuals to feel relatively less positive and more negative affect (no affective data was collected), which seems at least somewhat counterintuitive. This line of reasoning would fit well, however, with some aspects of 20th century reciprocity theories, which assumed that negative feelings of indebtedness were a primary driver of reciprocal action (to the extent that reciprocal behavior was motivated by affective rather than cognitive mechanisms; McCullough et al., 2001).

A third alternative hypothesis is that intergenerational reciprocity is driven by feelings of gratitude towards past generations for their beneficent intentions and actions. As discussed above, gratitude has already been established as a causal mechanism in the transmission of altruism across (rather than between) individuals (i.e., indirect or upstream reciprocity); moreover, gratitude appears to do a particularly good job of helping to explain the evolution and social advantages of such “pay it forward” prosociality (Nowak & Roch, 2007). Extending these effects to the intergenerational context seems a relatively small leap. Moreover, acting on behalf of posterity represents an obvious form of prosocial behavior, which I have previously indicated is positively and uniquely related to both trait- and state-level gratitude (e.g., McCullough et al., 2001; DeSteno et al., 2010).

Perhaps more importantly, the “gratitude explanation” avoids issues that arise with both fairness and indebtedness accounts of intergenerational beneficence. First, there is no expectation of interaction with either benefactors or beneficiaries in the case of non-overlapping generations (though this clearly does not hold for immediately preceding and following generations, e.g., children and grandchildren); thus there is no possibility of punishment nor negative social repercussions of not reciprocating with such distant (or extinct) generations, both of which are believed to be necessary for the translation of indebtedness into action (Greenberg, 1980). Gratitude does not rely on such negative reinforcement mechanisms (Fredrickson, 2004). Second, to the extent that feeling fairly

treated is positively related to the perception that the needs of future others are already being met (if not, it would be difficult to believe that one's generation had been treated fairly), such perceptions might actually demotivate intergenerational beneficence and perceptions of personal responsibility by leading individuals to believe that their own sacrifice is unnecessary. Again, the "gratitude hypothesis" seems relatively immune to this concern, as feelings of gratitude would be expected to be even stronger in cases where the present generation feels past generations have been especially altruistic.

Social cohesion: relationship formation, trust and cooperation

Gratitude is also a likely motivator of future oriented care and perceived responsibility because it promotes relationship formation and maintenance (e.g., Algoe et al, 2008), interpersonal trust (e.g., Dunn & Schweitzer, 2005) and cooperation in personally costly situations (e.g., DeSteno et al., 2010). For example, Algoe et al. (2008), examining the formation of relationships between sorority recruits and their "Big Sisters," argued that "gratitude may initiate a relationship-building cycle between recipient and benefactor." In addition, expressions of gratitude (e.g., saying "thank you") improve interpersonal relationships and continued positive social interaction (e.g., Carey, Clique, Leighton, & Milton, 1976); recently, Grant and Gino (2010) provided evidence indicating that one mechanism underlying this effect is increased perceptions of social worth felt by the benefactor.

Dunn and Schweitzer (2005) have showed that incidental feelings of gratitude (i.e., gratitude felt towards an unrelated third party) increase trust. Trust, in turn, is a critical ingredient in the promotion of cooperative behavior (cf., Milinski, Semmann, Bakker, & Krambaeck, 2001). DeSteno et al. (2010) recently showed that incidental experiences of gratitude can also enhance cooperative behavior directly, even at personal cost. After inducing individuals to feel grateful towards a confederate, participants played the "give some dilemma game" (GSDG), in which they had to decide between acting in

their own self-interest versus contributing to communal well-being (at personal cost); in the critical condition, participants played the GSDG with a third person (not with the confederate). Individuals who had been induced to feel grateful towards the first interaction partner (i.e., the confederate) acted more cooperatively with this previously unknown individual. DeSteno et al. interpreted their findings as supportive of the claim that the emotional state of gratitude can enhance cooperation and helping behavior directed even towards individuals who have not previously provided aid to the beneficiary—that is, the experience of gratitude leads beneficiaries to transform into benefactors. These results confirm what sociologists and philosophers have long said about gratitude, namely, that it acts as a counterweight to self-interest in cooperative societies (cf., Harpham, 2004; Hobbes, 1651/1991; Smith, 1790/1976).

These positive effects of gratitude have implications well beyond the context of dyadic relationships and contribute in significant ways to the development of group-level cohesion and social resources, including care-taking and stronger social integration and community bonds (e.g., Buck, 2004; Fredrickson, 2004; Froh et al., 2010). These resources are, in turn, available at times when the community must come together to solve group-level challenges that require overcoming short-term, individual-level incentives that harm the long-term prospects of the group (i.e., collective action problems; Fredrickson, 2004; Komter, 2004; Ostrom, 2000). Thus, gratitude—which arises and exists both within and between individuals—may increase beneficent action on behalf of future generations not only by increasing perceptions of responsibility towards the future, but also by enhancing the capacity of groups to respond to threats that require overcoming collective action problems. Such an argument seems closely in line with broader cultural and philosophical arguments about the fundamental nature and function of gratitude, i.e., as an interpersonal force that binds groups of unrelated individuals together through reward rather than punishment (cf., Harpham, 2004; Hobbes, 1651/1991; Komter, 2004; Simmel, 1908/1996; Smith, 1790/1976).

Possible moderators of the gratitude-future orientation relationship

A number of individual- and group-level factors may moderate the proposed relationship between gratitude and intergenerational care and concern. One obvious factor is gender: women score higher than men on measures of dispositional gratitude, report stronger feelings of gratitude in response to receiving aid and benefit more from the experience and expression of gratitude (e.g., Kashdan, Mishra, Breen, & Froh, 2009). These results suggest that gratitude may have a larger effect among women than men. Other possible demographic variable moderators include: age (older adults are already more oriented towards others' future well-being, and thus gratitude may be relatively less important, although dispositional gratitude may increase with age); parenthood (parents are more oriented towards future generations regardless of their level of gratitude, possibly weakening any effects); and income (gratitude may be a stronger predictor of beneficence among richer individuals, for whom the ability to act on behalf of future others at personal cost is a less constrained choice).

Recent work in political psychology suggests that political ideology, political party identification and psychological variables related to political and moral values all may moderate the gratitude-intergenerational beneficence relationship (see Cottam, Dietz-Uhler, Mastors, & Preston, 2004). First, liberals and conservatives demonstrate consistent differences in personality, values and interpersonal relationships, some of which may be relevant to the present research. For example, because conservatives prefer to maintain the status quo and are more nostalgic, they may be more inclined to use past generations' actions as a guide for how to behave towards future others (see Jost, Glaser, Kruglanski, & Sulloway, 2003). Separately, individual differences in gratitude may have a relatively weaker relationship to politically-relevant attitudes and behaviors (e.g., regarding climate change) for both conservatives and liberals relative to moderates (whose political attitudes are more malleable).

Social nature of “gratitude” and context specific effects

Finally, it is important that I mention one other very likely (almost certain) “moderator” of the gratitude-future orientation link proposed above, one that I do not examine empirically but rather hold constant in the studies discussed below, namely, the effect of culture and group-level effects. Thus far, my discussion of gratitude has treated the construct (at least in its emotional form) as a human universal, and indeed there is much evidence that suggests that some version of what I am here calling “gratitude” exists in nearly every culture (McCullough et al., 2001). Yet it is also critically important to recognize that gratitude, in nearly all of its forms, is a fundamentally social construct (Parkinson, 1996; Weber, 2004) and thus differs to some extent, in both its experience and especially expression, across groups (Shen et al., 2011). As Komter (2004) reminds us, a “sociological view on gratitude would emphasize *the interpersonal relationships and social interactions* in which gratitude gets shape” (p. 203, emphasis added). Thus, when we talk about gratitude, and especially its role in shaping interpersonal decision-making (whether in the intergenerational context or with contemporaries), it is important to recognize that these effects are to some extent culture- and group-specific; this seems especially true with respect to the magnitude of the “intergenerational gratitude” effect (e.g., gratitude may play a relatively smaller role in motivating prosocial behavior in communities or cultures that are highly oriented towards keeping track of debts owed to one another, which would seem to elevate the role of indebtedness or perhaps justice concerns). I return to these considerations in the Discussion.

Hypotheses and overview of present research

The preceding review and integration of past research generated a number of testable hypotheses regarding the proximal, psychological mechanisms underlying perceptions of responsibility towards the future and the transmission of beneficence across generations, particularly in the context of intergenerational environmental issues.

First, I predicted that gratitude—both at the dispositional and state levels—would correlate positively with or predict measures of perceived responsibility towards future generations (H1a), concern about intergenerational environmental issues (H1b) and various indicators of future-oriented environmental beneficence (H1c). Second, I expected (H2) that these effects would be moderated by various individual differences factors (i.e., political ideology) and demographic variables (e.g., income, gender). Third, I hypothesized that gratitude felt towards past generations represents a unique mechanism responsible for the intergenerational reciprocity effect previously demonstrated by Wade-Benzoni (2002). Specifically, I expected that past-oriented gratitude would uniquely and positively predict intergenerational altruism both between experimental conditions (Studies 2 and 3; H3a) and across all individuals (individual differences effects; H3b). Finally, I also predicted that these effects would be greater than those of perceptions that one had been treated fairly by past generations (H4a) and feelings of indebtedness (H4b).

I tested these hypotheses in a series of three observational and experimental studies, using a wide variety of measures to explore the unique role that gratitude plays in motivating perceptions of responsibility towards future generations and expressions of intergenerational environmental stewardship. In Study 1, I used a purely correlational design to begin examining relationships among the various constructs of interest, including: trait gratitude and indebtedness; perceptions of responsibility towards the future; environmental attitudes and policy preferences; climate change beliefs; moral values; future time orientation; political ideology (i.e., liberal vs. moderate vs. conservative); and various demographics. In Study 2, I attempted to replicate Wade-Benzoni's (2002) second study and to further develop our understanding of intergenerational reciprocity by examining possible mediating factors (i.e., gratitude, indebtedness and fairness). Finally, in Study 3, I further extended past research by examining whether past generations' mere good intentions (without beneficial results) were sufficient to generate gratitude towards past generations and subsequent

transmission of goodwill towards future others. Across all three studies, a positive relationship between measures of gratitude (both trait and situational) and measures of future-oriented beneficence and care emerged, providing consistent if preliminary evidence in support of the primary hypotheses posed above.

Study 1

Past research has demonstrated positive correlations between trait-level gratitude and various measures of prosocial behavior and personality (cf., McCullough et al., 2002). However, no extant research has yet examined whether and to what extent trait-level gratitude relates to perceptions of responsibility towards future generations (RTFG), concern about intergenerational environmental issues and willingness to take action on behalf of future others. Additionally, no research has yet explored the relative effects of gratitude on intergenerational care and concern compared to those of other plausible factors, including trait-level indebtedness and values related to fairness. Thus, in Study 1 I examine relations among these and other constructs of interest. Possible moderators (e.g., gender, political ideology) of the gratitude-future orientation link are also examined. In addition, I examine group-level differences in measures of RTFG (e.g., as a function of parental status, religious identification, educational attainment, income level), and in trait gratitude and trait indebtedness. Almost no research has explored group-level differences in perceptions of responsibility towards future others nor whether gratitude and indebtedness differ as a function of demographic and group identity variables.

Method

Participants

A total of 604 participants recruited from a national sample of adult internet users by Qualtrics completed the study online in return for approximately \$1.50; participants were fully opt-in. Qualtrics is a web-survey hosting company that works with several national and international web-panel providers (see www.qualtrics.com). Twenty-three

participants were excluded due to abnormally long completion times (more than three standard deviations above the mean) and 30 were excluded after failing catch questions embedded within the survey, leaving 551 valid respondents. Average completion time was 33.1 minutes (SD = 19.2). Sample demographics are shown in Table 3.1; mean scores on the GQ-6, Indebtedness-10 and RTFG-4 measures (see below) are also displayed and between-group differences are noted.

Procedure and materials

After providing consent, participants (PTs) reported their current mood on a 101-point scale (0 = “terrible,” 100 = “great”). Next, PTs completed the GQ-6 measure of trait gratitude (McCullough et al., 2002) and Naito and Sakata’s (2010) six-item measure of trait indebtedness. The GQ-6 is a well-validated measure of individual differences in trait-level gratitude (alpha = .83 in the present sample); the Indebtedness-6 measure, which is newer, appears to tap individuals’ level of discomfort associated with owing others. Pilot testing suggested the need for additional indebtedness-related items (initial alpha = .65); thus, four more items were included to broaden coverage (Indebtedness-10; alpha = .75). PTs next responded to a four-item Responsibility Towards Future Generations (RTFG-4) scale created specifically for this project (alpha = .78). Respondents then completed the following measures: environmental policy support (three items; alpha = .68); environmental attitudes (New Ecological Paradigm, alpha = .86; Dunlap, van Liere, Mertig, & Jones, 2000); climate change beliefs measure (five items constructed for this study); worldviews measure (12 items; Kahan, Braman, Gastil, Slovic, & Mertz, 2007); Moral Foundation Questionnaire (MFQ, 30 items; Graham et al., 2011); general system justification scale (alpha = .81; Kay & Jost, 2003); a measure of the Big 5 personality factors (BFI-10; Rammstedt & John, 2007); and, a seven-item version of the Consideration of Future Consequences Scale (CFCS, alpha = .80; Strathman et al., 1994). The order of these measures was randomized, and three ‘catch’

Table 3.1.
Demographics and Subgroup-Level Means on GQ-6, Indebtedness-10 and RTFG-4

| Characteristic | % Sample | GQ-6 (SD) | Indebted-10 (SD) | RTFG-4 (SD) |
|-----------------------|-------------|--------------|---------------------|----------------|
| Age | | * | * | |
| 19-29 | 19.4 | 5.34 (1.22) | 4.48 (.92) | 4.16 (1.05) |
| 30-39 | 18.5 | 5.54 (1.01) | 4.36 (.92) | 4.27 (.95) |
| 40-49 | 20.5 | 5.40 (1.01) | 4.37 (.86) | 4.32 (1.01) |
| 50-59 | 28.9 | 5.49 (.86) | 4.33 (.96) | 4.44 (.90) |
| 60 and up | 12.7 | 5.86 (.91) | 4.04 (.90) | 4.42 (1.01) |
| Gender | | *** | | * |
| Female | 56.1 | 5.70 (1.07) | 4.33 (.99) | 4.42 (.93) |
| Male | 42.4 | 5.23 (1.04) | 4.35 (.84) | 4.22 (1.02) |
| Ethnicity | | | | * |
| White | 82.1 | 5.48 (1.09) | 4.34 (.92) | 4.28 (.99) |
| Other | 17.9 | 5.57 (1.08) | 4.34 (1.10) | 4.52 (.85) |
| HH Income | | ** | | * |
| < \$30,000 | 34.9 | 5.29 (1.18) | 4.38 (.91) | 4.24 (1.05) |
| \$30,001-\$60,000 | 32.8 | 5.53 (1.07) | 4.24 (1.00) | 4.25 (.94) |
| \$60,001-\$90,000 | 20.8 | 5.69 (.93) | 4.38 (.86) | 4.40 (.94) |
| \$90,001 and up | 11.5 | 5.71 (.84) | 4.44 (.85) | 4.63 (.89) |
| Education attainment | | | | |
| High school or less | 21.8 | 5.44 (1.09) | 4.20 (1.00) | 4.24 (1.00) |
| Some college | 32.6 | 5.52 (1.09) | 4.44 (.87) | 4.41 (.99) |
| 2/4-year degree | 34.5 | 5.47 (1.09) | 4.38 (.92) | 4.33 (.98) |
| Advanced degree | 10.2 | 5.60 (1.00) | 4.19 (.94) | 4.27 (.91) |
| Marital status | | *** | | ** |
| Never married | 31.5 | 5.23 (1.13) | 4.44 (.89) | 4.12 (1.01) |
| Married/partnered | 53.3 | 5.71 (1.00) | 4.32 (.96) | 4.43 (.96) |
| Other | 15.2 | 5.29 (1.10) | 4.19 (.83) | 4.40 (.91) |
| Parenthood | | *** | | *** |
| No | 43.6 | 5.20 (1.13) | 4.40 (.89) | 4.14 (1.03) |
| Parent only | 33.6 | 5.65 (.99) | 4.36 (.96) | 4.45 (.85) |
| Grandparent | 22.7 | 5.83 (.94) | 4.21 (.91) | 4.51 (1.00) |
| Religious affiliation | | *** | | |
| Christian/Catholic | 61.1 | 5.74 (.96) | 4.34 (.92) | 4.39 (.93) |
| Other, religious | 10.4 | 5.32 (1.13) | 4.42 (1.07) | 4.39 (.91) |
| Non-religious | 28.5 | 5.05 (1.15) | 4.30 (.88) | 4.20 (1.07) |
| Political Party ID | | ** | | ** |
| Republican | 23.7 | 5.70 (1.09) | 4.45 (.96) | 4.19 (1.08) |
| Democrat | 34.1 | 5.56 (1.02) | 4.37 (.89) | 4.52 (.86) |
| Independent | 18.9 | 5.28 (1.18) | 4.19 (.91) | 4.32 (.94) |
| Other | 23.3 | 5.38 (1.03) | 4.31 (.95) | 4.20 (1.03) |
| Environmentalist | | | | *** |
| Yes | 33.6 | 5.53 (1.12) | 4.33 (.89) | 4.66 (.88) |
| No | 66.4 | 5.48 (1.05) | 4.35 (.94) | 4.16 (.99) |
| <i>Total N</i> | 551 | 5.50 (1.08) | 4.34 (.92) | 4.33 (.98) |

Note: Significant omnibus tests indicated by * above comparisons. *** $p < .001$ ** $p < .01$ * $p < .05$

questions were inserted throughout the survey in order to weed out inattentive PTs⁵. Finally, PTs provided demographic information and were thanked for their participation. (See Appendix B for complete wording and scales of all measures.)

Results

Responsibility towards future generations

I first examined relations between the RTFG-4 and more proximal measures of intergenerational environmental stewardship (IES). A separate pilot study conducted before the present study (Markowitz, unpublished data) revealed that the RTFG-4 was significantly correlated with multiple measures of IES and future orientation, including: environmentalism, pro-environmental behavioral intentions, climate change concern, and perceived personal moral obligation to respond to climate change. In the present sample, the RTFG-4 was significantly correlated with numerous indicators of IES, including: environmental attitudes (as measured by the NEP), $r(548) = .41, p < .001$, and environmentalism, $r(545) = .24, p < .001$; climate change concern, $r(548) = .44, p < .001$, and personal moral obligation to respond, $r(546) = .51, p < .001$; greater support for requiring electric utilities to increase production of clean energy, despite increased consumer costs, $r(544) = .35, p < .001$; and, greater support for the U.S. signing an international treaty to cut emissions by 90% by 2050, $r(543) = .34, p < .001$. The RTFG-4 also correlated strongly with the CFCS, $r(548) = .58, p < .001$. These results suggest that the RTFG-4 is strongly related to a wide array of future-oriented attitudes, policy preferences and behavioral intentions.

Gratitude, indebtedness and perceived responsibility towards the future

The GQ-6 correlated significantly with the CFCS, $r(549) = .27, p < .001$, but not with the Indebtedness-10, $r(548) = .01, p = .87$. As predicted (H1a), the GQ-6 was positively correlated with perceptions of responsibility towards the future, $r(548) = .36, p < .001$ ⁶. In contrast, the RTFG-4 correlated weakly with the Indebtedness-10 measure,

$r(548) = .12, p = .01$. To further explore the robustness of the relationship between gratitude and RTFG, I conducted a hierarchical multiple regression predicting scores on the RTFG-4. As shown in Table 3.2, the final model accounted for 50% of the variance in scores on the RTFG-4⁷. Moreover, the final addition of the GQ-6 and Indebtedness-10 measures significantly (if only slightly) increased the overall predictive validity of the model, $\Delta r^2 = .02, F(2, 489) = 10.14, p < .001$, and the GQ-6 (but not the Indebtedness-10) was a unique predictor, $B = .17, t = 4.08, p < .001$. These results confirm the unique, positive relationship that trait gratitude has with individuals' perceptions of responsibility towards future others.

Other measures of future orientation

In contrast, neither the GQ-6 nor Indebtedness-10 measures demonstrated significant zero-order correlations with the IES indicators, including environmental attitudes, environmental policy preferences and climate change concern and perceived moral obligation. Given the robust relationships between each of these measures and the RTFG-4, these findings are somewhat surprising. However, supporting Hypothesis 2, political ideology was found to moderate the relationships among the various IES indicators and gratitude. Among self-identified conservatives and liberals, neither trait gratitude nor indebtedness were significantly correlated with the IES indicators. However, among ideological moderates, significant positive correlations emerged between the GQ-6 and the NEP, $r(186) = .26, p < .001$, climate change concern, $r(186) = .35, p < .001$, and environmental policy preferences: increasing renewable energy, $r(186) = .27, p < .001$; and adopting an international emissions treaty, $r(186) = .21, p = .005$. Similarly, small but significant partial correlations emerged (in the full sample) between the GQ-6 and these IES indicators when controlling for ideology and various demographic variables. These results likely reflect the more fluid nature of moderates'

engagement with environmental issues and policy prescriptions. (I tested other potential moderators but did not find other moderation effects.)

Table 3.2.
Summary of Multiple Regression Results Predicting RTFG-4 (Study 1)

| Predictor | Model 1 Demographics | | Model 2 1 + Politics & Identity | | Model 3 2 + Individual differences | | Model 4 3 + Gratitude & Indebtedness | |
|------------------|-------------------------|-----|---------------------------------------|-----|--|-----|--|-----|
| | β | SE | β | SE | β | SE | β | SE |
| Gender (Female) | -.16 | .09 | -.10 | .08 | .06 | .08 | .09 | .07 |
| Age | .01 | .00 | .01 | .00 | .00 | .00 | .00 | .00 |
| Income (30-60k) | -.06 | .11 | -.06 | .10 | -.05 | .10 | -.05 | .08 |
| Income (60-90k) | .14 | .12 | .09 | .12 | .05 | .11 | .01 | .10 |
| Income (90k+) | .33* | .15 | .35* | .15 | .20 | .14 | .17 | .12 |
| Parent | .29** | .10 | .35*** | .10 | .23** | .09 | .20* | .08 |
| Grandparent | .22 | .13 | .27* | .13 | .08 | .12 | .06 | .10 |
| Some college | .05 | .12 | .05 | .12 | .03 | .11 | .00 | .09 |
| College | .00 | .12 | -.02 | .12 | -.05 | .11 | -.07 | .09 |
| Advanced degree | -.17 | .17 | -.27 | .16 | -.23 | .15 | -.23 | .13 |
| Not White | .27* | .11 | .23* | .11 | .18 | .10 | .17 | .09 |
| Ideology | -- | -- | .06 | .03 | .05 | .03 | .06* | .03 |
| Republican | -- | -- | -.10 | .13 | -.04 | .12 | -.05 | .11 |
| Independent | -- | -- | -.16 | .13 | -.17 | .12 | -.11 | .10 |
| Other Party | -- | -- | -.18 | .12 | -.12 | .11 | -.10 | .10 |
| Environmentalist | -- | -- | .46*** | .09 | .18* | .08 | .20** | .07 |
| Openness | -- | -- | -- | -- | .00 | .04 | -.02 | .03 |
| Agreeable | -- | -- | -- | -- | .10* | .05 | .07 | .04 |
| Conscientious | -- | -- | -- | -- | -.03 | .05 | -.05 | .04 |
| Extraversion | -- | -- | -- | -- | -.03 | .04 | -.03 | .04 |
| Neuroticism | -- | -- | -- | -- | -.01 | .03 | .00 | .03 |
| Religiosity | -- | -- | -- | -- | .02 | .02 | .01 | .02 |
| System just. | -- | -- | -- | -- | -.04 | .03 | -.06* | .03 |
| MFQ Harm | -- | -- | -- | -- | .25*** | .07 | .23*** | .06 |
| MFQ Fair | -- | -- | -- | -- | -.05 | .07 | -.07 | .06 |
| MFQ Ingroup | -- | -- | -- | -- | .11* | .06 | .09 | .06 |
| MFQ Authority | -- | -- | -- | -- | -.03 | .07 | -.01 | .06 |
| MFQ Purity | -- | -- | -- | -- | .01 | .05 | .01 | .05 |
| CFCS | -- | -- | -- | -- | .66*** | .05 | .62*** | .05 |
| GQ-6 | -- | -- | -- | -- | -- | -- | .15*** | .04 |
| Indebtedness-10 | -- | -- | -- | -- | -- | -- | .07 | .04 |
| R^2 | .07 | | .15 | | .48 | | .50 | |
| R^2 adj | .05 | | .12 | | .45 | | .47 | |

Note. Values are unstandardized regression coefficients.
* $p < .05$ ** $p < .01$ *** $p < .001$

Secondary analyses

As mentioned above, little extant research has explored group-level differences in trait gratitude, trait indebtedness and perceptions of RTFG (but see Kashdan et al., 2009 for one exception). Table 3.1 reports mean responses to the GQ-6, Indebtedness-10 and RTFG-4 for various subgroups within the sample. There were significant group-level

differences on the GQ-6 as a function of age (older people tended to report higher levels of gratitude), gender (women scored higher), household income (richer individuals scored higher), marital status (married/partnered individuals scored highest), parenthood (parents and grandparents scored higher than non-parents), religious affiliation (Christians and Catholics scored highest), and political party (Independents scored lower than Republicans and Democrats). There were also numerous group-level differences on the RTFG-4, as we might expect (e.g., Democrats scored higher than Republicans; environmentalists higher than non-environmentalists; parents higher than non-parents).

Discussion

Results of Study 1 provided clear support for Hypotheses 1a (gratitude relates positively to perceived responsibility towards the future) and 2 (gratitude-IES relation is moderated by individual differences factors), and qualified support for Hypotheses 1b (gratitude relates positively to environmental concern) and 1c (gratitude relates positively to future-oriented environmental beneficence): people who were more dispositionally grateful tended to be more strongly concerned with the well-being of future generations. Moreover, moderation effects emerged with respect to more proximal measures of intergenerational environmental stewardship: trait gratitude correlated positively with concern for intergenerational environmental issues and with support for personally costly ameliorative policies, but only among ideological moderates.

The findings support the claim that affective constructs generally associated with reciprocal exchange (i.e., gratitude) are related to individuals' perceptions of responsibility towards future others. These results obtained despite the fact that Study 1 may have set a relatively high bar for identifying links between gratitude, indebtedness and concern for future others: both the GQ-6 and Indebtedness-10 are domain-general measures and not, on the surface, obviously related to concern for future others; this

should serve to strengthen confidence regarding the existence of a true and meaningful relationship between gratitude and concern for the future.

Study 2

Study 1 provided initial evidence that dispositionally grateful people perceive greater personal responsibilities towards future generations. However, it did not examine the primary pathway by which such effects are hypothesized to emerge, namely, that people act on behalf of future others in part due to feelings of gratitude induced by learning about the good deeds performed on their behalf by earlier generations. In Study 2, I explicitly examine this route to intergenerational beneficence using a previously developed paradigm (Wade-Benzoni, 2002; Study 2): Participants are given information about the history of the federal gasoline tax that frames past generations as having acted either altruistically or relatively more selfishly. In both conditions (plus a control), participants learn about the benefits that have accrued to their generation as a result of the existence of the gas tax and about further benefits that will accrue to future generations if Americans raise the tax further. The advantages of using this paradigm are threefold: first, it provides two distinct opportunities to test the ‘intergenerational gratitude’ hypothesis (i.e., between conditions and between subjects); second, it allows me to more directly test the effects of gratitude against those of indebtedness and fairness; and third, it covers a topic that is both salient to Americans and highly relevant in terms of its intergenerational significance. I hypothesized that individuals who feel more grateful towards past generations will demonstrate increased willingness to impose higher gas taxes on themselves (H3a and H3b) and that these effects would be stronger than those of either indebtedness or perceptions of fairness (H4a and H4b). I also expected to replicate Wade-Benzoni’s (2002) intergenerational reciprocity finding (i.e., greater beneficence in the ‘positive past generations’ condition), and to find a mediating effect of gratitude.

Method

Participants

Participants (PTs) were 505 adult internet users in the U.S. recruited through Amazon's Mechanical Turk (MTurk) service (see Buhrmester, Kwang, & Gosling, 2011 for more about using MTurk participants). Participants were paid \$0.51. The median age of the sample was 31 years old ($SD = 12.71$); 68.8% identified as female and 80.5% identified as white/Caucasian. Educational achievement was heterogeneous in the sample: 12.6% reported having attained a high school education or less, 30.6% reported 'some college,' 41.7% had an associate's or bachelor's degree, and 15.0% had an advanced or professional degree. Thirty-seven percent identified as environmentalist. With respect to political identification, 20.5% identified as Republican, 40.1% as Democrat, and 15.9% as Independent (all remaining participants indicated 'other' or 'no party'). Eighty-nine (18%) participants were excluded after failing catch questions and three participants were excluded for providing invalid responses (i.e., non-numerical answers) to the primary dependent variable leaving 413 valid respondents. Average completion time was 19.25 minutes ($SD = 7.83$).

Procedure and materials

After providing informed consent, PTs completed the same measure of present affect as in Study 1. Next, PTs were told that the researchers were "conducting comprehensive research to gather information on the issue of gasoline taxation." In all conditions, participants read about the benefits of the federal gas tax for improving national security, the environment and the federal budget. Participants then read one of three paragraphs which framed past generations' decisions with regards to the implementation of the gas tax in either a negative, positive or neutral light (see Appendix B for full wording). The 'negative past' and 'positive past' conditions replicated the wording used in Wade-Benzoni's Study 2 (2002). All PTs then read that any increases in

the federal gas tax would place greater burdens on people living today but that doing so would provide significant benefits to future generations of Americans. After reading the information, participants were immediately asked whether they felt the federal gas tax should be increased and if so by how much. Respondents then completed a series of follow-up questions. These questions included items measuring feelings of gratitude and indebtedness towards past generations and of affinity towards future generations, as well as perceptions of past generations' fairness, present generations' responsibility towards the future, and uncertainty regarding the benefits of implementing further taxes. Full question wording is provided in Appendix B.

Participants then completed another measure of present affect and the following measures from Study 1: GQ-6; Indebtedness-6; RTFG-4; climate change beliefs and concern; worldviews; BFI-10; CFCS; and, demographics.

Results

Data preparation

Across all PTs, the mean proposed increase in the federal gas tax was 25.17 cents ($SD = 37.85$), similar to what Wade-Benzoni (2002) reported. However, the raw 'gas tax' variable was extremely positively skewed ($skewness = 3.70$), in part due to the large number of 'zero' responses as well as due to a small number of extreme responses (e.g., \$3.00 increase). To reduce the impact of the 'high tax' outliers, I chose a cutoff of \$1.00. I then performed a square root transformation on this slightly modified variable, which produced a much more reasonably distributed dependent variable ($skewness = .35$). I used this transformed variable in the analyses below.

Between-groups findings

A marginally significant effect of the manipulation on PTs' gas tax preferences emerged, $F(2, 410) = 2.44, p = .09$. Looking only at the two previously used conditions, there was a marginal trend in the opposite direction of the one reported by Wade-Benzoni

(2002), whose initial studies were run with MBA students: Individuals in the ‘positive past’ condition were less willing to self-impose gas taxes ($M = 20.01$, $SD = 29.67$) than were PTs in the ‘negative past’ condition ($M = 24.39$, $SD = 30.93$), $F(1, 271) = 3.23$, $p = .07^8$; the control condition had the highest mean response ($M = 30.89$, $SD = 48.95$). No consistent and significant moderating effects emerged, despite examination of many plausible factors (e.g., political ideology, gender, trait-level gratitude). However, significant effects did emerge with respect to some of the follow-up questions.

Participants in the ‘negative past’ and ‘positive past’ conditions differed from one another with respect to perceived fairness (PTs in the ‘positive past’ condition scored higher) and beliefs regarding the positive impacts on future generations of imposing gas taxes (higher in the ‘negative past’ condition), although the groups did not differ with respect to items tapping perceived obligation towards the future or affinity with future generations; PTs in the ‘positive past’ condition felt marginally more grateful towards past generations than those in the ‘negative past’ condition, $F(1, 271) = 2.90$, $p = .09$. These results suggest that PTs were to some extent affected by the experimental manipulation, but that this had little effect on responses to the gas tax measure.

Between-subjects findings

Given the presence of few between-group differences, I collapsed the data across the three conditions in order to test Hypotheses 3b (past-oriented gratitude positively predicts intergenerational stewardship across individuals), 4a (effect of gratitude is stronger than that of fairness) and 4b (effect of gratitude is stronger than that of indebtedness). To examine the unique effects of the various proximal and distal constructs in shaping individuals’ gas tax preferences, I conducted a hierarchical multiple regression analysis. In addition to the key measures of interest (i.e., past gratitude, indebtedness and fairness), I also entered numerous demographic, identity and individual differences factors as predictors of responses to the gas tax measure. Table 3.3 presents

results of this analysis. Gratitude felt towards past generations was a unique, positive predictor of gas tax preferences, $b = .51, t = 2.82, p = .005$ (supporting H3b), whereas perceptions of past generations' fairness was a *negative* predictor, $b = -.81, t = 4.40, p < .001$ (H4a); indebtedness was not a unique predictor (H4b). Other unique predictors included: trait gratitude, openness, agreeableness, and beliefs about positive impacts of taking action on future generations. As expected, the addition of the six more proximal measures significantly increased variance explained, and the final model explained 31%

Table 3.3.
Summary of Multiple Regression Results Predicting Gas Tax Responses (Study 2)

| Predictor | Model 1 Demographics | | Model 2 1 + Politics & Identity | | Model 3 2 + Individual differences | | Model 4 3 + Future responsibility | | Model 5 4 + Proximal measures | |
|--------------------|-------------------------|------|---------------------------------------|-----|--|-----|---|-----|-------------------------------------|-----|
| | β | SE | β | SE | β | SE | β | SE | β | SE |
| Gender (Female) | .71 | .32* | .72* | .31 | .55 | .31 | .53 | .31 | .32 | .27 |
| Age | -.01 | .01 | .00 | .01 | .01 | .01 | .00 | .01 | .02 | .01 |
| Income (30-60k) | -.07 | .34 | .02 | .34 | .00 | .33 | .03 | .33 | .09 | .29 |
| Income (60-90k) | .06 | .43 | .09 | .43 | .01 | .42 | .04 | .42 | -.16 | .37 |
| Income (90k+) | .25 | .50 | .47 | .50 | .63 | .49 | .56 | .48 | .59 | .43 |
| Parent | .14 | .32 | .23 | .32 | .16 | .32 | .07 | .31 | .09 | .28 |
| Some college | .10 | .48 | -.06 | .48 | .00 | .48 | .00 | .47 | -.25 | .42 |
| College | .27 | .47 | .08 | .47 | .19 | .47 | .14 | .47 | -.26 | .41 |
| Advanced degree | .30 | .56 | .12 | .56 | .25 | .55 | .19 | .55 | -.09 | .48 |
| Not White | .33 | .36 | .20 | .36 | .06 | .36 | .10 | .35 | .07 | .31 |
| Environmentalist | -- | -- | .07 | .31 | -.07 | .31 | -.18 | .31 | -.34 | .28 |
| Republican | -- | -- | -.27 | .53 | -.07 | .52 | .06 | .52 | -.24 | .46 |
| Independent | -- | -- | -.61 | .44 | -.59 | .43 | -.51 | .43 | -.42 | .38 |
| Other Party | -- | -- | -.08 | .40 | -.08 | .40 | -.05 | .39 | .07 | .34 |
| Ideology | -- | -- | .28* | .12 | .31* | .13 | .29* | .13 | .06 | .11 |
| Religiosity | -- | -- | -- | -- | .05 | .07 | .06 | .07 | .03 | .06 |
| CFCS | -- | -- | -- | -- | .51* | .21 | .21 | .23 | .20 | .21 |
| GQ-6 | -- | -- | -- | -- | -.17 | .16 | -.24 | .16 | -.46** | .14 |
| Indebtedness-6 | -- | -- | -- | -- | .19 | .15 | .22 | .15 | .15 | .13 |
| Extraversion | -- | -- | -- | -- | .04 | .13 | .10 | .13 | .19 | .11 |
| Openness | -- | -- | -- | -- | -.27* | .13 | -.34* | .13 | -.22 | .12 |
| Agreeable | -- | -- | -- | -- | .57*** | .15 | .54*** | .15 | .30* | .13 |
| Neurotic | -- | -- | -- | -- | -.06 | .13 | -.06 | .13 | -.01 | .11 |
| Conscientious | -- | -- | -- | -- | -.51** | .18 | -.47** | .18 | -.19 | .16 |
| RFTG-4 | -- | -- | -- | -- | -- | -- | .51** | .16 | .25 | .16 |
| Past Fairness | -- | -- | -- | -- | -- | -- | -- | -- | -.81*** | .18 |
| Past Gratitude | -- | -- | -- | -- | -- | -- | -- | -- | .51** | .18 |
| Past Indebted | -- | -- | -- | -- | -- | -- | -- | -- | .07 | .11 |
| Responsibility | -- | -- | -- | -- | -- | -- | -- | -- | -.10 | .15 |
| Affinity | -- | -- | -- | -- | -- | -- | -- | -- | .14 | .18 |
| Impacts | -- | -- | -- | -- | -- | -- | -- | -- | 1.10*** | .14 |
| R ² | .02 | | .06 | | .14 | | .16 | | .37 | |
| R ² adj | -.01 | | .03 | | .08 | | .10 | | .31 | |

Note. Values are unstandardized regression coefficients. Ideology is coded 1 = Extremely conservative, 7 = Extremely liberal.

* $p < .05$ ** $p < .01$ *** $p < .001$

of the variance in the transformed gas tax measure. Some plausible interaction effects were explored in secondary analyses (e.g., interaction between trait and state gratitude), but no consistent effects emerged.

Secondary analyses

The RTFG-4 correlated significantly with the GQ-6, $r(410) = .21, p < .001$, but not with the Indebtedness-6, $r(410) = -.04, p = .38$. Similarly, the CFCS correlated significantly with GQ-6, $r(410) = .31, p < .001$, but not with the Indebtedness-6, $r(410) = .05, p = .29$. The CFCS and RTFG-4 were strongly correlated, $r(410) = .50, p < .001$. The GQ-6 and Indebt-6 were weakly correlated, $r(410) = .10, p = .05$. All of these effects replicated findings from Study 1. Ideological conservatives reported higher levels of gratitude towards past generations in the context of gas taxes than did liberals, $t(322) = 2.90, p < .01$; similarly, conservatives scored slightly higher on the GQ-6, $t(322) = 1.83, p = .07$. In contrast, liberals scored higher on the RTFG-4, $t(322) = 3.76, p < .001$, and the CFCS, $t(322) = 2.40, p = .02$. Not surprisingly, liberals were willing to take on a significantly larger gas tax ($M_{\text{original}} = 27.39, SD = 38.31$) than conservatives ($M_{\text{original}} = 18.41, SD = 26.61$), $t(322) = 3.04, p < .001$.

Discussion

Despite failing to replicate Wade-Benzoni's (2002; Study 2) intergenerational reciprocity results between conditions (see below), Study 2 provided evidence largely supportive of the primary hypotheses proposed above: Individuals who felt grateful towards past generations after reading about their actions regarding an important intergenerational issue were more willing to take on personal burdens (by paying higher taxes) in order to improve the well-being of future generations; these findings could not be explained by differences in trait level gratitude. Additionally, little evidence was found implicating feelings of indebtedness in motivating intergenerational beneficence in this domain. In contrast to the effects of gratitude, participants who felt that their own

generation had been fairly treated by past others were statistically *less* willing to impose gas taxes on themselves. One possible explanation of this somewhat surprising (although not unforeseeable) finding is suggested by a secondary result that was observed: perceptions of fairness and perceived certainty of the positive future benefits that would occur as a result of greater taxes were negatively correlated with one another, $r = -.23$, $p < .001$. This suggests that feeling fairly treated may act to demotivate intergenerational care and concern by increasing perceptions that personal sacrifice is unlikely to contribute significantly to future well-being.

How do I explain the discrepancy between the present experimental findings and those reported by Wade-Benzoni (2002)? One possible explanation has to do with differences between the populations sampled in the two studies: Wade-Benzoni ran her study with a small number ($n = 61$) of MBA students whereas the present study involved over 400 adult participants of all ages, education levels and geographical locations around the U.S. Another potentially significant difference between the samples involves timing and cultural differences: Wade-Benzoni ran her study in the mid-1990s, at a time when environmental issues, and particularly climate change, were less politically polarized and Americans may have been less fiercely anti-tax than in 2011, when the present study was run (cf., McCright & Dunlap, 2011). Yet another potentially important difference between the two studies involves the method of administration, as the earlier study was conducted by pen and paper in person whereas the present study was run via the internet; the different modes may have affected participants' comprehension and attention to the manipulated information. The significant discrepancy between the present and earlier findings indicates the need for further research.

Study 3

Study 1 established a clear relationship between gratitude and intergenerational concern and Study 2 advanced our understanding of the proximal mechanisms underlying

the transmission of benefits across generations, i.e., situational gratitude. These results provide significant initial support in favor of the major hypotheses driving the present research. One (of many) questions that remains open at this point is whether intergenerational stewardship can be motivated by feelings of gratitude even when past generations tried but *failed* to pass along sufficient benefits, thus leaving it up to the current generation to provide for future others. That is, do we feel grateful for the “good intentions” of past others even when they have come up short in providing for us? This is an important question in part because it mirrors the reality of many of the intergenerational environmental and social problems we currently face. In Study 2, the intentions behind past generations’ actions were left ambiguous. Study 3 was designed to avoid this shortcoming and explore this question of *intention* in a novel intergenerational environmental context: funding the U.S. national park system.

Method

Participants

Participants (PTs) were 305 U.S. adults recruited through MTurk. Respondents were paid \$1.01 for participating. The median age of the sample was 29.0 years ($SD = 11.69$); 58.5% identified as female and 80.2% identified as white/Caucasian. Participants came from 42 states. Educational achievement levels were again diverse: 10.3% reported holding a high school diploma or less, 26.7% reported ‘some college,’ 45.8% possessed an associate’s or bachelor’s degree, and 18.7% had an advanced or professional degree; 35.5% self-identified as being an environmentalist. With respect to political identification, 17.2% identified as Republican, 39.9% as Democrat, and 21.2% as Independent (all remaining participants indicated ‘other’ or ‘no party’). Thirty-two participants were excluded after failing catch questions, leaving 273 valid respondents. Average completion time was 16.78 minutes ($SD = 7.81$).

Procedure

Participants were given a short fictional article to read about the U.S. national parks. The article discussed the founding of the U.S. National Parks Service (NPS) by previous generations, a lack of funding facing the system in the future, and the need for the National Park Foundation (NPF)—the charitable branch of the NPS—to raise funds from private citizens. It was made clear to PTs that the parks were not currently in danger of being closed due to lack of funds, but that the funding outlook for the future was grim. The ‘intentions’ manipulation was embedded in the second paragraph. Participants in the ‘positive past intentions’ (PPI) condition read that the founders of the national park system had tried hard to provide sufficient funding but had come up short, leaving it to the present generation to fund the parks; PTs in the ‘no positive intentions’ (NPI) condition were told that past generations of Americans had not tried to provide long-term funding but rather had intentionally left it to future generations to provide funding; finally, PTs in a control condition were simply told that past generations had been unable to fund the system in perpetuity but no mention of their intentions was made.

After reading the article, PTs were asked how much they would be willing to donate to the NPF to help fund the NPS; PTs were told that the researchers would randomly select a small number of respondents’ answers to the donation question and actually make the donation to the NPF (which was done). This measure served as the primary dependent variable for the study. Participants were next asked how much they supported or opposed four policies relevant to funding the NPS. They then completed a series of manipulation check and follow-up items similar to those asked in Study 2. Participants were also asked whether they had ever been to a national park, how believable they found the article, and how real or hypothetical the donation question felt to them. Participants then completed the following: GQ-6; Indebtedness-10; three-item measure of generalized RTFG; MFQ-Fairness; NEP-5; worldviews; CFCS; and,

demographics. After completing all measures, PTs were debriefed. Full wording of all measures and experimental materials is provided in Appendix B.

Results

Data preparation

Initial examination of the primary dependent variable—hypothetical donations to the National Parks Foundation—revealed a number of outliers and extreme positive skew; 11 participants indicated they would donate more than \$100. For purposes of all analyses below, I limited maximum donations to \$100. The resulting variable still demonstrated extreme skew; applying a square root transformation reduced distributional concerns significantly (*Skewness* = .66). I use this transformed variable in all subsequent analyses (but I present group-level means in original units for clarity). Results are not significantly affected by use of this transformed measure.

Between-groups findings

There was no effect of condition on self-reported willingness to donate to help protect the national park system, $F(2, 270) = 1.78, p = .17$. Participants in the PPI condition said they would donate \$22.62 on average ($SD = 32.41$), those in the NPI \$20.07 ($SD = 29.93$), and those in the control condition \$25.66 ($SD = 31.20$). Similarly, there were no group-level differences in support for any of the four funding policies. These results were not moderated by any of a wide variety of individual differences and demographic variables that were tested, including political ideology, gender, income, parenthood and environmental values, nor did significant between-groups effects emerge after controlling for these and other variables. In contrast, the manipulation did have an effect on participants' perceptions of past generations: participants in the PPI condition agreed more strongly that past generations had “tried hard to provide funding” ($M = 5.02, SD = .96$) than did participants in the control condition ($M = 4.51, SD = 1.24$), who in turn scored higher than individuals in the NPI ($M = 3.24, SD = 1.49$), $t_{\text{contrast}}(268) = 9.56$,

$p < .001$. Additionally, relative to participants in the NPI condition, those in the PPI and control conditions felt they had been treated more fairly, $t_{\text{contrast}}(268) = 4.35, p < .001$, felt more grateful towards past generations, $t_{\text{contrast}}(268) = 4.03, p < .001$, and believed more strongly that past generations had acted in their best interest, $t_{\text{contrast}}(270) = 4.13, p < .001$. Thus, as in Study 2, the present study does not lend support to the intergenerational reciprocity hypothesis, as learning about past generations' positive intergenerational intentions did not increase beneficence towards future others.

Between-individuals findings

Collapsing across conditions⁹, higher donations were associated with stronger beliefs regarding the importance of maintaining the nation's parks, $r(271) = .32, p < .001$, perceptions of personal responsibility to provide for the future as a result of past generations' actions, $r(271) = .38, p < .001$, and the belief that one has a personal obligation to provide for future generations, $r(271) = .41, p < .001$. In line with the main hypotheses of this chapter, stronger feelings of gratitude for past generations' actions also correlated positively with donation behavior, $r(271) = .16, p = .01$, as did feeling indebted towards past others, $r(271) = .29, p < .001$, whereas feeling that past generations acted fairly did not, $r(271) = .03, p = .66$. More distal correlates of donation behavior included environmental attitudes, $r(271) = .23, p < .001$, the GQ-6, $r(271) = .19, p = .001$, and, generalized perceptions of responsibility towards future generations, $r(271) = .26, p < .001$. The Fairness subscale of the MFQ was not correlated with donation behavior, $r(271) = .09, p = .15$. In follow-up multiple regression analyses, both state gratitude and indebtedness were unique positive predictors of donation behavior, whereas perceptions of fairness was a significant, negative predictor (replicating findings from Study 2). Other unique predictors included: income (higher income, larger donations), gender (men donated less), ethnicity (whites donated more), and parental status (parents donated less).

Discussion

Results of Study 3 largely replicated those of Studies 1 and 2, confirming the unique and robust (if modest) relationship between feelings of gratitude towards past generations and beneficent attitudes and behavior directed towards future others. However, as with Study 2, I failed to replicate Wade-Benzoni's (2002) intergenerational reciprocity effect, as there were no significant differences in donation behavior as a function of the experimental manipulation. Given that there were observed group-level differences in gratitude (in the predicted direction) and perceptions of fairness, one interpretation of these findings is that although gratitude does relate to future-oriented beneficence, experimental manipulations of it are not a strong driver of such behavior, at least under the constrained conditions afforded by running this and previous studies online.

Another possibility is that the manipulation used in this study was simply not strong enough to produce a behavioral effect; the fact that the control and 'positive past intentions' conditions differed very little from one another would seem to support this conclusion. A third possibility is that the use of a hypothetical donation rather than a personally costly action made participants relatively insensitive to their affective reactions at the time of decision-making; this may have been the case if asking people to make a hypothetical rather than real donation led participants to think more explicitly about their ability to donate (hence pushing them towards a more cognitive rather than affective decision-making process). Although the use of a personally costless measure is a limitation of this study, the fact that the mean donation across the three conditions was roughly \$25 (a seemingly reasonable amount in this context) suggests that individuals took the task seriously. Finally, sample differences between the present study and Wade-Benzoni's (2002) work may also have contributed to the divergent results.

Study 3 suggests that mere positive intentions are capable of generating feelings of goodwill and gratitude towards past generations. Despite the lack of experimental effects, the study provides further evidence in favor of the hypothesis that feelings of gratitude are positively related to expressions of intergenerational environmental concern and stewardship. In contrast to Study 2, however, the study also revealed that feelings of indebtedness towards the past may, in some cases, similarly demonstrate a unique, positive relationship with future-oriented prosocial action. One admittedly speculative explanation for the divergent findings between Studies 2 and 3 is that the use of a widely appreciated public good in the latter study—national parks—may have led participants to have generally stronger affective responses than in the earlier study (in which participants read about something that few people actually like, i.e., gas taxes). Future research should explore how the subjective value of a received benefit shapes the relative balance of gratitude and indebtedness responses.

General discussion

Across three studies, a unique, positive relationship between the social, cognitive and affective construct of gratitude and intergenerational environmental concern consistently emerged. I found that both trait and state measures of gratitude related positively to perceptions of responsibility towards future others (supporting H1a), concern about environmental issues (supporting H1b), and various indicators of intergenerational environmental stewardship (supporting H1c). I also found support for H2: some of these effects were moderated by individual difference factors (e.g., political identity). Although I was unable to test H3a (past-oriented gratitude mediates the intergenerational reciprocity effect), the findings of Studies 2 and 3 supported H3b (past-oriented gratitude predicts intergenerational stewardship across individuals).

In contrast to the observed effects of gratitude, neither trait- nor state-level feelings of indebtedness consistently predicted intergenerational beneficence or

perceptions of responsibility towards future others, as expected (H4b). Similarly, the results suggest that one other previously proposed mechanism underlying future-oriented altruism—perceptions of having been treated fairly by past generations—may in fact not play a critical role in driving such behavior and perhaps even negatively predicts future-oriented beneficence and responsibility (supporting H4a).

Although Studies 2 and 3 failed to replicate the experimental findings reported by Wade-Benzoni (2002), they extend the underlying theory of intergenerational beneficence she helped to develop by identifying a unique pathway by which the transmission of benefits across generations may occur, i.e., via feelings of gratitude towards past others. The present research also extends extant theory and research on the link between gratitude and prosocial action (e.g., Bartlett & DeSteno, 2006; Tsang, 2006a) into a novel domain, namely, the relationships that exist between past, present and future generations.

The findings presented above are necessarily preliminary given that research on gratitude in the intergenerational context is in its infancy, but they appear to fit well with past research on the role of gratitude in motivating upstream reciprocity, cooperation among strangers and the development of strong interpersonal bonds and community (social) resources (e.g., Algoe et al., 2008; DeSteno et al., 2010; Fredrickson, 2004; Nowak & Roch, 2007). Moreover, by examining the effects of gratitude in the intergenerational context—in which there is no possible expectation of interaction either with one's benefactors or potential beneficiaries—the present work appears to provide further evidence that gratitude works to promote prosocial action and attitudes outside the confines of what we traditionally think of as “reciprocity” (e.g., Gouldner, 1960). That is, the present research supports Fredrickson's (2004) claim that gratitude has positive consequences for social interaction and the building of social resources that appear to be (nearly) totally divorced from its role in motivating reciprocal behavior.

The present research also appears to directly support Simmel's (1908/1996) contention that gratitude serves a "moral memory" function within and perhaps across individuals: feeling grateful towards past others for benefits they bestowed upon us bolsters the perception that one is personally responsible for the well-being of future others. Importantly, these effects were distinct from the previously demonstrated connection between generalized (personal) future-orientation and willingness to take action on behalf of future others (e.g., in the environmental domain; see Joireman et al., 2004; Strathman et al., 1994). Taken together with past findings implicating the experience of gratitude in building interpersonal trust (e.g., Dunn & Schweitzer, 2005), the present research suggests that gratitude may play an important role in fostering cooperation within and between generations in the face of collective action problems, such as climate change, which require both individuals and communities to overcome short-term interests in order to generate long-term benefits (Ostrom, 2000).

Possible explanations of the intergenerational gratitude effect

The present results clearly demonstrate the existence of an "intergenerational gratitude" effect. How might we account for this effect? One obvious, if somewhat unsatisfying, explanation is simply that incidental feelings of gratitude foster prosocial behavior, as previously discussed and established (cf., Bartlett & DeSteno, 2006; DeSteno et al., 2010)—in the present case, individuals were given information that made (some of) them feel grateful towards a benefactor (i.e., past generations) and as a result those individuals reported more prosocial attitudes and behavioral intentions towards others (i.e., future generations). A clear limitation of this "simple prosociality" explanation, of course, is that it is non-specific; that is, it does not predict that thinking about past generations' good deeds should lead specifically to future-oriented beneficence, but rather that doing so would promote any form of prosocial action, present- or future-oriented (I discuss this further in the Limitations section below).

A second possibility is that gratitude felt towards past others highlights an individual's position in a broader intergenerational community (see also Wade-Benzoni & Plunkett Tost, 2009), which in turn may increase individuals' feelings of affinity with future others. A third and related possibility, couched in the language of research on intertemporal discounting (cf., Frederick et al., 2002), is that feelings of gratitude act to flatten individuals' intergenerational discount function by making the fact that one's own needs have been satisfied by past others more salient, much as considering future consequences flattens intertemporal discounting (Joireman, Balliet, Sprout, Spangenberg, & Schultz, 2008). Both of these explanations would seem to fit well with McCullough et al.'s (2002) first proposed function of gratitude, namely, that it serves as a "benefit detector" (i.e., feeling grateful alerts people to the fact that they have been the beneficiaries of someone else's prosocial actions). Clearly, more work is necessary to determine which of these (or other) mechanisms might explicate the observed effect of gratitude on intergenerational care and concern.

Implications for theory: Is past-oriented gratitude an affective state?

One important consideration that arises from the present work regards my conceptualization of gratitude as a predominantly affective construct in the intergenerational context. In Studies 2 and 3, I claimed to measure gratitude as a state-level, affective process induced by reminders of the good deeds performed (by past generations) on one's behalf. Although such an interpretation clearly fits with recent theoretical conceptualizations of gratitude as a relatively "hot" affective state (McCraty & Childre, 2004), a plausible alternative interpretation of the measures used is that they in fact were indicators of a somewhat more "cool" socio-cognitive appraisal process. That is, measures of situationally induced gratitude may have tapped into a relatively conscious (as opposed to intuitive or affective) process of mental accounting, which helped to distinguish between individuals who more strongly (cognitively) recognized

(and positively accepted) their status as beneficiaries of others' beneficent behavior versus those who did not. Measures of state-level indebtedness, similarly, may be reinterpreted as indicators of negatively-valenced recognition of one's status as a beneficiary. Such an interpretation does not diminish the significance of the findings presented above but, I believe, may actually suggest the possibility of a novel "form" of situational gratitude that emerges in the intergenerational context. Further research is clearly needed to determine the extent to which situationally-induced "feelings of gratitude," directed either at contemporaries or at past generations, are in fact affective as opposed to cognitive or, perhaps, socially constructed (see below). To that end, cross-cultural research may be particularly useful in clarifying the underlying psychological and social processes at work when individuals are reminded of others' good deeds.

Cultural and group-level effects

As briefly discussed in the Introduction, gratitude is a fundamentally social phenomenon that occurs in the context of interpersonal interaction (physical or otherwise; Fredrickson, 2004; Komter, 2004). Moreover, the specific functions that gratitude plays likely differ to some extent between groups (e.g., as a function of culture, gender, and age cohort), as do norms regarding when and how it is appropriate to both experience and express gratitude towards others (see, e.g., the large cross-cultural literature on gift giving). In addition, the importance of gratitude at the cultural-level, for example, as a personal virtue to be valued and practiced, may differ across both time and geographical space; these differences likely reflect or are shaped by other widely-shared values that can themselves shift over time (e.g., the centrality of individualistic and hierarchical worldviews). At the same time, cultures and communities differ with respect to their orientations towards the past, present and future (cf., Hall & Hall, 1990; Sadari & Flammia, 2011). As a result, it is likely that reminders of past generations' actions and questions about responsibility towards the future generate different effects across groups.

Thus, in interpreting the present findings, it is doubly important to consider the cultural context within which and the population with which my studies were run (i.e., 21st century, computer-literate Americans) and to recognize that the observed results may look different in another (cultural) setting.

For example, in some cultures, reminders of past generations' good deeds may be either superfluous or simply irrelevant because their orientation towards the past and future is either already highly salient or else non-linear (e.g., time is conceptualized as circular in nature rather than as "progressing" in a linear manner across generations). For others, however (including contemporary American culture), such reminders may have quite striking effects on intergenerational decision-making. For example, because Americans are generally oriented towards the short-term future (Dundes, 1969; Hall & Hall, 1990), both past generations' actions and future generations' needs likely have low baseline salience for most Americans. This suggests that there is "room" to increase their salience experimentally. On the other hand, Americans' future-orientation may make them relatively less sensitive to the actions of past generations, and thus they may not feel particularly grateful towards them (even after explicit reminders). Moreover, it should be obvious that such effects of time orientation will interact with cultural values related to the experience and expression of gratitude to shape how reminders of the past affect perceptions of responsibility towards the future. Although many of these and other (very interesting) cultural-level and interactive effects are not explored in the present research, it is clear that they represent an intriguing and important direction for future research.

Implications for intervention development

In addition to extending our understanding of intergenerational decision-making in a new direction, the present research also holds important implications for the design of novel interventions aimed at increasing the incidence of future-oriented prosocial behavior. Past work has already shown that increasing individuals' daily experiences of

gratitude improves physical health, subjective well-being, relationship satisfaction and maintenance, prosocial behavior and a number of other positive outcomes (e.g., Emmons & McCullough, 2003; McCullough et al., 2001). At least within the context of contemporary American culture, my findings potentially suggest that inculcating the experience and expression of gratitude, in this case towards past generations, may also work to increase present generations' concern for and beneficent behavior on behalf of future generations (although such a causal claim cannot be confirmed given the present data). Such interventions might be particularly effective in enhancing engagement with intergenerational issues (such as climate change) in part by providing a psychological buffer against the oftentimes highly aversive nature of information about such problems (see related work by Sparks, Jessop, Chapman, & Holmes, 2010 that examines the effects of self-affirmation interventions in increasing engagement with climate change).

In addition to directly increasing feelings of gratitude towards past generations (e.g., through the use of priming techniques), another exciting direction for intervention development will involve integrating gratitude-based message frames into communications strategies and persuasive appeals. For example, messages aimed at increasing public concern over and engagement with climate change might include references to sacrifices made by past generations on behalf of present generations or, as Study 3 indicates, references to past generations' intention to leave a viable world to their descendants, even if they left the present generation with significant burdens. There is now a small but growing body of empirical research on the relative effectiveness of various communications strategies with respect to enhancing public engagement (attitudinal, behavioral and political) with climate change and other intergenerational issues (for some recent examples, see Feygina, Jost, & Goldsmith, 2009; Kahan et al., 2007; see Nisbet, 2009 for an overview). There is an even smaller but encouraging framing literature that is explicitly using moral-based frames (e.g., guilt, Ferguson &

Branscombe, 2010; harm and purity, Feinberg & Willer, in press). Given the generally positive view that Americans hold of gratitude as a virtue (Gallup, 1998), it seems possible that gratitude-based message frames may be especially effective in circumventing problems associated with political polarization on many pressing intergenerational issues (cf., McCright & Dunlap, 2011).

Limitations

The empirical research presented here has a number of obvious limitations that should be addressed by future research. First, the use of internet samples (Qualtrics and MTurk) and methods clearly limits our ability, at this point, to generalize from the present findings to other populations and contexts. That being said, the use of these samples allowed me to collect large samples and to avoid the use of college students (who likely differ from the general population in important ways with respect to measures of gratitude, future orientation and perceptions of responsibility). A more significant limitation of the present work, alluded to above, is that in Studies 2 and 3, I did not test whether thinking about past generations' good deeds increases only future-oriented beneficence or prosociality more generally (future- or present-oriented). That is, I did not explicitly demonstrate that gratitude felt towards the past motivates a "pure time preference" for the future (i.e., that subsequent prosocial behavior would still be future-oriented even if an opportunity to provide aid to contemporaries was also made available). This shortcoming is shared by Wade-Benzoni's (2002) work, and future research should correct it by measuring whether or not results are importantly different when prosocial behavior is directed towards contemporaries.

Finally, although the three studies demonstrated a highly consistent correlation between gratitude and future-orientation, they do not provide definitive evidence that gratitude is an underlying mechanism by which transmission of beneficence across generations occurs. Future research must employ methods that will allow for explicit

testing of Hypothesis 3a posed above (i.e., that gratitude mediates the effect of thinking about past generations' good deeds on intergenerational stewardship).

Unresolved questions and future directions

As with any new topic of study, the present research raises more questions than it answers and there is clearly a need for continued research in numerous directions. Some of these unresolved questions and future directions have already been mentioned above, including: the need to uncover underlying mechanisms that help to explain the gratitude-intergenerational beneficence (and responsibility) link; examining the role of past-oriented gratitude in other cultures; and testing various intervention designs to see if gratitude can be used in “real world” settings to enhance prosocial action towards future others. Perhaps the most pressing need is to establish whether or not feelings of gratitude towards past others play a causal role in shaping intergenerational decision-making, which will require further experimental work.

Another interesting direction for future research will be to examine how gratitude, future-time orientation and generativity concerns (McAdams & de St. Aubin, 1992) interact with one another to shape environmental decision-making in the present. Leffel, Fritz and Stephens (2008) have suggested that gratitude, along with numerous other “moral affective capacities,” is one underlying driver of generativity, but no empirical research has yet been conducted on the topic. In a related vein, it remains unknown whether the ability and predisposition to experience gratitude develops over time beyond childhood (e.g., as individuals move from early- to mid- to late-adulthood); longitudinal research that examines the developmental course of both dispositional gratitude and concern for future generations might be especially enlightening with respect to explaining some of the underlying mechanisms involved in the “intergenerational gratitude” effect.

Another unresolved issue has to do with the somewhat unintuitive and surprising observed effects of perceived fairness. As reported above, individuals who perceived that

past generations had “done their part” and treated the present generation fairly tended to report lower levels of perceived responsibility towards the future and were less willing to take on personal burdens (e.g., higher gas taxes) to provide for future generations. These negative (partial) effects of perceived fairness stand in stark contrast to what I think is a widely held assumption that considerations of justice are an important motivator of prosocial behavior, both towards future others and contemporaries (see Jamieson, 2010 for a similar argument from moral philosophy). One important consideration to note is that these negative effects emerged with measures that specifically tapped perceptions of past generations’ actions, not future-oriented justice or fairness concerns. Future research is clearly needed either to confirm or dispute the negative “fairness effect” observed in the present data as well as to explain why it emerged.

Finally, in this paper I have been careful to talk almost exclusively about “responsibility” towards future generations, yet I could have just as easily examined individuals’ perceptions of future-oriented “obligations.” Recent research has begun to examine the responsibility-obligation distinction from a descriptive perspective (e.g., Goei & Boster, 2005), revealing (as we might expect) that gratitude tends to be associated with perceptions that prosocial behavior is voluntary whereas indebtedness is more closely associated with perceptions of obligation to help others (Naito & Sakata, 2010). In research I have conducted recently (Markowitz, unpublished data), I have also begun to examine the extent to which individuals make a distinction between “responsibilities” and “obligations,” specifically in the context of intergenerational issues, and have found similar findings. Further research examining the etiologies of perceptions of responsibility and obligation towards future others may help clarify how the constructs of gratitude, indebtedness and fairness relate to one another in the intergenerational context.

Conclusion

Much of the multidisciplinary literature on intergenerational ethics and decision-making has focused on the present and the future. Yet it is clear that our (i.e., the present generation's) decisions regarding the intergenerational issues we face—from climate change to debt crises to maintaining critical infrastructure—are shaped by the actions and intentions of past generations, not only because past decisions constrain the options available to present decision-makers but also because they shape our perceptions of responsibility towards the future. Here, I have proposed that the multifaceted construct of gratitude helps us to understand how this latter process occurs, and in three studies I have provided initial evidence that those who feel grateful towards past others demonstrate greater levels of concern and care for future generations. Future research will clarify the extent to which gratitude plays a causal role in the transmission of beneficence across generations and whether gratitude-based interventions may be effective in increasing the present generation's willingness to act on behalf of future others.

Bridge to Chapter IV

Chapters II ('Is climate change an ethical issue?') and III ('Who cares about the future?') present results of five empirical studies which point to the critical role that morally relevant beliefs, emotions and perceptions play in shaping how we engage or fail to engage with the critical environmental challenges we face. In the present chapter, I demonstrated that such beliefs and perceptions of responsibility towards future others (as well as willingness to act on behalf of future generations) are more powerfully related to affective mechanisms (i.e., feelings of gratitude) than they are to more cognitive ones (i.e., perceptions of fairness). Thus, Chapter III clearly supports my contention that moral and affective processes are critically important in the environmental domain. In Chapter IV, I build on and expand this work by examining some of the limits to the role of affect (in particular) in shaping prosocial, proenvironmental action. In a series of studies, I

explore how the level of compassion shown towards non-human victims in need of aid (e.g., polar bears, pandas) is affected, in some individuals and groups, by secondary features of the problem at hand in ways that are counterproductive. Thus, in the next chapter, I suggest and show that although morally-relevant, affective mechanisms can and do play an important role in motivating environmental stewardship, there are important limits to these effects in certain conditions. Understanding when affective motives fail us in the environmental domain is thus critical if our aim is to maintain and increase individual and collective engagement with the environmental challenges we face.

Notes

1. Throughout this chapter, I am interested in individual and collective decision-making that affects future *others*. There is a vast literature on intertemporal decision-making that examines decisions involving trade-offs between the present-self vs. future-self. Some of that literature is relevant in the intergenerational context (e.g., intertemporal discounting), but as Wade-Benzoni and Plunkett Tost (2009) and others have argued, there are important ways in which intergenerational decision-making is quite distinct.

2. Future orientation refers to “the extent to which individuals consider the future implications of current activities” (Strathman et al., 1994, p. 742) and the extent to which such considerations motivate intertemporally-relevant decision-making.

3. Note that my reading of Trivers’ (1971) use of the term “gratitude” differs somewhat from other researchers working in this field (e.g., McCullough et al., 2008). I see no clear evidence that Trivers was clearly speaking about gratitude in the way that I and others’ have recently defined it, namely, as a distinctly positive emotional reaction to recognition of benefits bestowed by others. To me, it appears that Trivers could just as easily have been discussing the emotional state of “indebtedness” as “gratitude.”

4. It is important to note that these increases in intergenerational stewardship were all relative to conditions in which participants learned that their generation had been treated poorly by past others and no neutral control conditions were included in those studies.

5. The primary catch question involved having participants read a paragraph in which they were told the importance of weeding out inattentive respondents; they were told to ignore the next two questions presented on screen and write “I read the instructions” in the last question displayed. Full wording is presented in Appendix B.

6. A second measure of trait gratitude, Watkins et al.’s (2003) GRAT, was also included in Study 1; the GRAT also correlated positively with RTFG-4, $r(548) = .38, p < .001$. I did not include the GRAT in subsequent studies, and so do not report further findings.

7. Although multicollinearity is a possible concern when so many related variables are included in a model together, all VIFs were less than three (3).

8. This F -test is reported using the transformed dependent variable. Using the original, non-transformed data (means reported in the text), the already marginal effect disappears completely, $F(1, 271) = 1.39, p = .24$.

9. These findings were not significantly moderated by experimental condition.

CHAPTER IV

ARE PANDAS LIKE PEOPLE? COMPASSION FADE AND THE CHALLENGE OF ENVIRONMENTAL PROTECTION

[The studies presented in this chapter were designed, conducted and analyzed primarily by Ezra Markowitz. Significant contributions to the theoretical development of the chapter were made by Paul Slovic, Daniel Västfjäll and Sara Hodges. I was the primary contributor to this work and did all of the writing.]

A single child fallen down a well or dying of starvation stirs our hearts and moves our hands (and wallets) to action (Jenni & Loewenstein, 1997). Yet as soon as the number of victims increases to *two*, compassion begins to wane (Västfjäll, Peters & Slovic, 2012). Such *compassion fade* has been widely documented in the humanitarian domain in recent years (see below; Slovic, 2007) and is troubling for at least three reasons. First, it defies our normative beliefs about how we *should* value the lives of those in need (MacLean, 1986). Second, it contradicts our intuitions about how we ourselves would react when asked to aid others (Dunn & Ashton-James, 2008). Third, it suggests that confronting large-scale humanitarian and (perhaps) environmental crises—from mass starvation to genocide to rapid species extinction—may not only involve overcoming political and economic hurdles but insidious psychological ones as well (Gifford, 2011).

Nearly all extant research on compassion fade has focused on humanitarian causes (e.g., starving children in Africa; cf., Cameron & Payne, 2011; Small,

Loewenstein & Slovic, 2007). As a result, it is not yet known whether, to what extent, and among which individuals or groups compassion fade emerges when victims are non-human animals. However, because the environmental challenges we face involve millions of unidentified victims, there is a distinct possibility that compassion fade occurs in this domain, hampering policymakers' and environmental advocates' efforts to allocate sufficient resources to protect non-human animal species. Here, we extend research on compassion fade into this previously unstudied, yet critical, domain; we also contribute to the broader psychological literature on compassion fade by examining a novel moderator variable, i.e., personal commitment to a cause.

Compassion fade and the provision of aid

Past research has found that decision-makers are often insensitive to the scope of humanitarian and environmental crises (Kahneman & Knetsch, 1992), providing similar levels of aid regardless of the number of victims in need. For example, Devousges et al. (1993) demonstrated that willingness to pay to protect migrating birds from preventable, human-caused deaths varied little whether the number of birds affected was 2,000 or 200,000. These and other findings suggest that compassion towards others quickly reaches a horizontal asymptote as the number of victims increases. However, findings from a number of distinct, if related, lines of inquiry suggest that in some cases compassion actually decreases (rather than staying constant) as the number of victims increases, a phenomenon we refer to as compassion fade.

Three primary sets of findings speak to the existence of compassion fade. First, when asked to provide aid, individuals are highly sensitive to the proportion of victims that can be helped, showing less compassion to help the same absolute number of victims

as the total population of those in need (including victims who cannot be helped) increases (Bartels, 2006; Fetherstonhaugh, Slovic, Johnson & Friedrich, 1997; Jenni & Loewenstein, 1997). Such effects are clearly non-normative when distributional concerns are set aside (Baron, 1997), as knowledge of those who cannot be aided should not demotivate provision of aid to those who can be helped (Slovic, 2007). Second, numerous studies have demonstrated that (many) individuals respond more compassionately to requests for aid that describe a single, identified victim (e.g., a starving child whose picture is shown) than they do to requests that statistically describe the scope of a humanitarian crisis (cf., Friedrich & McGuire, 2010; Small et al., 2007) or to requests that combine both types of appeals. Third, greater compassion is shown to a single, identified victim than towards just two (Västfjäll et al., 2012), three (Schmidt & Wilson, 2011) or eight victims (e.g., Cameron & Payne, 2011; Kogut & Ritov, 2005). Thus, compassion fade is a robust phenomenon that emerges under numerous eliciting conditions.

Explaining compassion fade

Numerous affective, cognitive and motivational mechanisms have been proposed to account for compassion fade. For example, decision-makers may show greater compassion to a single victim in part because a single individual elicits an inherently stronger affective response than does a group (Kogut & Ritov, 2005; Slovic, 2007). Smith, Faro and Burson (in press) suggest this may be the case in part because groups of individuals are perceived as less cohesive (i.e., they lack entitativity). Compassion fade may also occur in part because although humans are well-practiced at taking another person's perspective (which generally increases altruistic behavior), taking the

perspective of a group is relatively difficult (Batson et al., 1997). In a different vein, overreliance on proportional reasoning may lead to perceptions of inefficacy as the reference group to which victims belong increases in size (so-called “drop-in-the-bucket” effects; Baron, 1997). And from a motivational perspective, Cameron and Payne (2011) have argued that individuals preemptively down-regulate their emotional response in helping situations when they know they will be asked to aid multiple individuals (in order to avoid being overwhelmed by the scope of the aid request). These various accounts are not mutually exclusive, and each likely plays a role in shaping individuals’ compassionate behavior towards others.

Critically, although much of the past research on compassion fade has treated the phenomenon as a “main effect” (Friedrich & McGuire, 2010), recent work has demonstrated that some individuals are more susceptible than others. For example, Cameron and Payne (2011) showed that sympathy for one victim was greater than for eight victims only among participants who were relatively skilled at emotion-regulation. Friedrich and McGuire (2010) found that compassion fade emerged only among individuals who scored relatively low on a measure of rational (as opposed to experiential) processing style (Pacini & Epstein, 1999). And Smith et al. (in press) have suggested that compassion fade is more likely to occur among individuals who perceive groups of victims as lacking cohesiveness or entitativity (e.g., incremental theorists; see Dweck, 1999). These recent findings have helped clarify why and under which conditions compassion fade emerges, which in turn may provide insight regarding effective interventions to ameliorate the effect.

Compassion fade in the environmental domain

Whether or not compassion fade will emerge when the individuals in need of aid are non-human animals is presently unknown. On the one hand, both the contingent valuation findings discussed above as well as anecdotal evidence suggest that the effect may occur in the environmental domain (cf., Song, 2002). Moreover, Smith et al.'s (in press) entitativity studies, which included animals as targets of aid, provide indirect evidence that processes related to compassion fade in the humanitarian domain may translate to the environmental context.

Other findings, however, raise doubts. For example, Hart (2011) found that information about the negative effects of climate change on all polar bears produced stronger support for ameliorative policies than did information about negative effects on a single bear; however, this study did not examine individuals' willingness to help the polar bear(s) specifically, but rather engagement with a broader environmental issue. Hsee and Rottenstreich (2004) found that donations to help one versus four pandas were not significantly different when photos of the animals were shown to participants (although the researchers' use of the same photo copied four times to represent multiple pandas may simply have failed to make salient the existence of multiple individuals). And Kogut and Ritov (2007) found that compassion fade occurred (with human victims) only when decision-makers learned about in-group members in need of aid (helping behavior directed at out-group members was similar regardless of how many victims were presented); these findings suggest that compassion fade is unlikely to emerge to the extent that non-human animals are perceived as out-group members.

Given these conflicting findings as well as the moderation effects discussed above, it is unclear whether compassion fade will emerge in the environmental domain and, if so, whether individual differences factors might moderate the effect. For example, Kogut and Ritov's (2007) in-group/out-group findings suggest that when victims in need are animals, individuals who are not highly concerned about or engaged with environmental issues (i.e., non-environmentalists) may demonstrate relatively weak compassion fade effects (since animals are likely to be perceived as out-group members by such individuals); in contrast, we might expect to observe greater compassion fade among environmentalists (who may perceive animals as in-group members).

However, we predicted that just the opposite pattern of results would obtain in the environmental domain: greater levels of compassion fade among non-environmentalists than among environmentalists. We suspect that rather than being influenced by whether or not an animal or species is perceived to be a member of one's in-group, compassion fade is more powerfully driven by an individual's prior knowledge about and commitment to an issue (in this case, environmental issues). Thus, we expect environmentalists—who are more aware of and educated about environmental issues—to demonstrate relatively little or perhaps no compassion fade; for such individuals, hearing about animals in need, be it a single victim or thousands, may simply serve as a reminder of the widespread problem that exists, a problem they have previously thought about and are already committed to confronting. In contrast, non-environmentalists lack a broader framework for interpreting information about a specific aid request (and are likely relatively less interested in the problem at hand); as a result, these individuals may rely more heavily on affective and motivational cues and mechanisms—which have

previously been shown to produce compassion fade—when deciding whether and how much aid to provide, leading to greater compassion fade. We directly tested these hypotheses in a series of three studies.

Study 1

Past research has established that individuals are sensitive to the relative proportion of victims that can be helped: as the ratio of those helped to those who are “unreachable” decreases, individuals’ willingness to provide aid generally decreases (Fetherstonhaugh et al., 1997). This is the case even when the actual number of victims being helped does not change. In Study 1, we examined whether this phenomenon occurs when the victims are non-human animals.

Methods

Participants

Participants were 181 undergraduate students (128 females, 53 males; mean age = 20.38 years, $SD = 4.20$; 76% Caucasian, 24% other races) from a mid-sized public university in the northwestern U.S. who participated in return for course credit. Fifty-seven (31.5%) self-identified as environmentalists and 124 (68.5%) did not. Average completion time for all tasks was 31.26 minutes ($SD = 12.88$).

Procedure and measures

Participants completed all measures as part of an omnibus study conducted online; exposure to the experimental manipulation and dependent measures occurred at the beginning of the study. Participants in both conditions were told that a recent hurricane had destroyed breeding platforms used by an at-risk population of wood storks living in the southern U.S. Participants were then told that local volunteer groups were

raising funds in order to reconstruct 450 platforms to help the birds. In the ‘small population’ condition, the total population was said to consist of 1,100 word storks; in the ‘large population’ condition, the population consisted of 25,000 birds. After reading the information, participants were asked how much they would consider donating to help the birds using a 6-point scale divided into \$10 increments (\$0 to \$50). Participants also reported how likely they would be to travel to the affected area to help the volunteers, using a 5-point scale (1 = *not at all likely*, 5 = *extremely likely*). After completing a number of unrelated measures, participants were asked whether they identified as an environmentalist (*yes, no*). Materials are provided in Appendix C.

Results and discussion

Participants’ responses to the donation and volunteering items served as the dependent variables; the two items were modestly correlated, $r(179) = .33, p < .001$, and examined separately. Responses to the volunteering question were entered into a 2 (small vs. large population) x 2 (environmentalist vs. non-environmentalist) between-subjects analysis of variance, which yielded a significant main-effect of environmentalism, $F(1, 176) = 5.05, p = .03, \eta^2 = .03$, and the expected interaction between environmentalism and condition, $F(1, 176) = 4.38, p = .04, \eta^2 = .02$. Planned simple effects analyses revealed an effect of condition among non-environmentalists, $F(1, 122) = 8.07, p = .01, \eta^2 = .06$, but not among environmentalists, $F(1, 54) = .36, p = .55, \eta^2 = .01$. Non-environmentalists were more willing to volunteer in the ‘small population’ condition ($M = 2.12, SD = 1.02$) than in the ‘large population’ condition ($M = 1.64, SD = .85$).

A second 2 (small vs. large population) x 2 (environmentalist vs. non-environmentalist) between-subjects analysis of variance was performed on the donation

request item. A main-effect of environmentalism emerged, $F(1, 176) = 11.30, p = .001, \eta^2 = .06$, as did a non-significant but trending interaction between condition and environmentalism, $F(1, 176) = 2.28, p = .13, \eta^2 = .01$ (see Fig. 4.1). Planned simple effects analyses revealed that non-environmentalists in the ‘small population’ condition reported larger hypothetical donations ($M = 14.46, SD = 14.58$) than did those in the ‘large population’ condition ($M = 9.49, SD = 8.60$), $F(1, 122) = 5.21, p = .02, \eta^2 = .04$. In contrast, environmentalists donated similar amounts in the ‘small population’ ($M = 18.08, SD = 11.32$) and ‘large population’ conditions ($M = 19.00, SD = 12.69$), $F(1, 54) = .08, p = .78, \eta^2 < .01$.

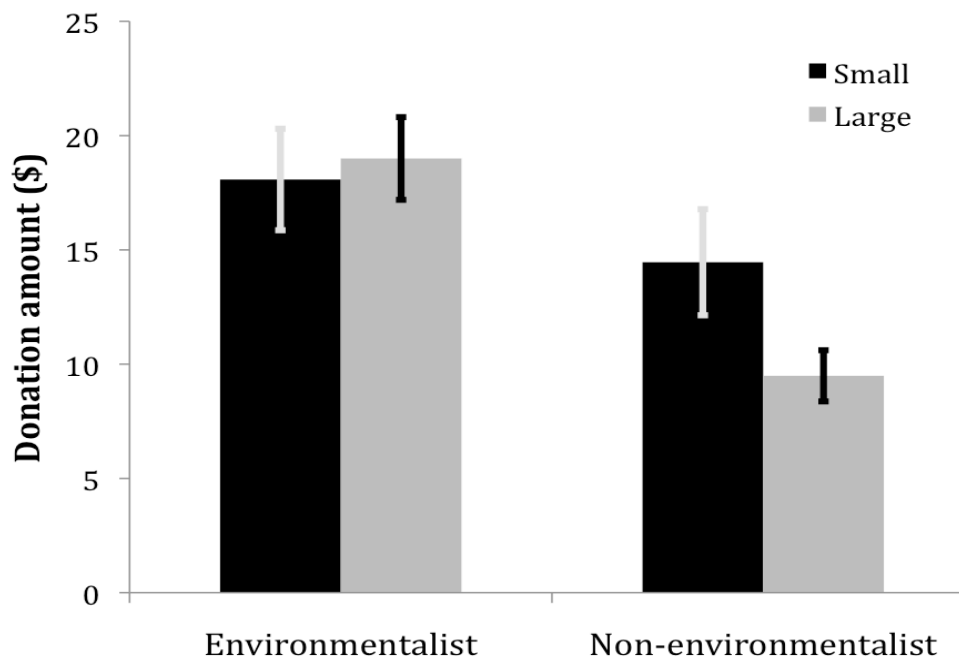


Figure 4.1. Shows results from Study 1: non-environmentalists donated significantly less to help the same number of wood storks (450) when the total population was large (25,000) than when it was small (1,100). Environmentalists donated similar amounts in the two conditions. Error bars show ± 1 standard error.

Thus, Study 1 provided initial support for our hypothesis: using two distinct measures of compassionate behavior, we found that information revealing that a smaller proportion of animals could be helped reduced willingness to help among non-environmentalist participants. In contrast, such information had no effect on the level of aid provided by environmentalists. These findings suggest that for individuals who are relatively less practiced and interested in thinking about the scope of environmental issues (i.e., non-environmentalists), secondary features of the helping situation (e.g., proportion of animals that can be helped) may play an outsized role in driving compassionate decision-making.

Study 2

In Study 2, we examined the emergence of compassion fade in the environmental domain using a distinct paradigm, in which participants were either told about the plight of a single, identified animal or else given information about the challenges facing an entire population of threatened animals. Past research has demonstrated that information about a single, identified (human) individual generates greater levels of affective and behavioral compassion than does statistical information about a group (e.g., Small et al., 2007); however, the possible moderating role of commitment to a cause has not been examined in this context.

Methods

Participants

The sample consisted of 212 undergraduate students (149 females, 63 males; mean age = 19.72 years, $SD = 2.88$; 82% Caucasian, 18% other races) from a mid-sized public university in the northwestern U.S. who participated in return for course credit.

Seventy-six (35.8%) self-identified as environmentalists and 136 (64.2%) did not.

Average completion time for all tasks was 19.88 minutes ($SD = 7.22$).

Procedure and methods

As in Study 1, the manipulation and dependent variables were the first measures presented as part of a larger omnibus survey conducted online. In both conditions, participants were told to imagine that after unexpectedly finding \$10, an individual working with the group ‘Save the Polar Bears’ handed them a letter asking if they would consider donating to help protect the bears. In the ‘population’ condition, participants were shown a montage of polar bear pictures and given some facts about the challenges currently facing the world’s polar bear populations (e.g., the lack of food and habitat); in the ‘identified’ condition, participants saw a picture of a single adult bear and were given similar information as in the ‘population’ condition, except that the information was about the single bear (who was given a name). Participants were then asked how much of the \$10 they would consider donating to help the bear(s) on an 11-point scale (\$0-10). As in Study 1, participants indicated their environmental identity at a later point. Materials are provided in Appendix C.

Results and discussion

A 2 (identified vs. population) x 2 (environmentalist vs. non-environmentalist) between-subjects analysis of variance yielded a main effect of environmentalism, $F(1, 208) = 7.58, p = .01, \eta^2 = .04$, and a marginally significant interaction, $F(1, 208) = 3.07, p = .08, \eta^2 = .02$ (see Fig. 4.2). The pattern of results was nearly identical to the one that emerged in Study 1. Results of planned simple effects tests showed that non-environmentalists donated more to help a single polar bear ($M = 6.21, SD = 3.66$) than

they did to help all of the polar bears ($M = 4.64, SD = 3.55$), $F(1, 134) = 6.47, p = .01, \eta^2 = .05$. In contrast, environmentalists said they would donate similar amounts in the ‘identified’ ($M = 6.73, SD = 3.82$) and ‘population’ conditions ($M = 6.97, SD = 3.15$), $F(1, 74) = .09, p = .77, \eta^2 < .01$.

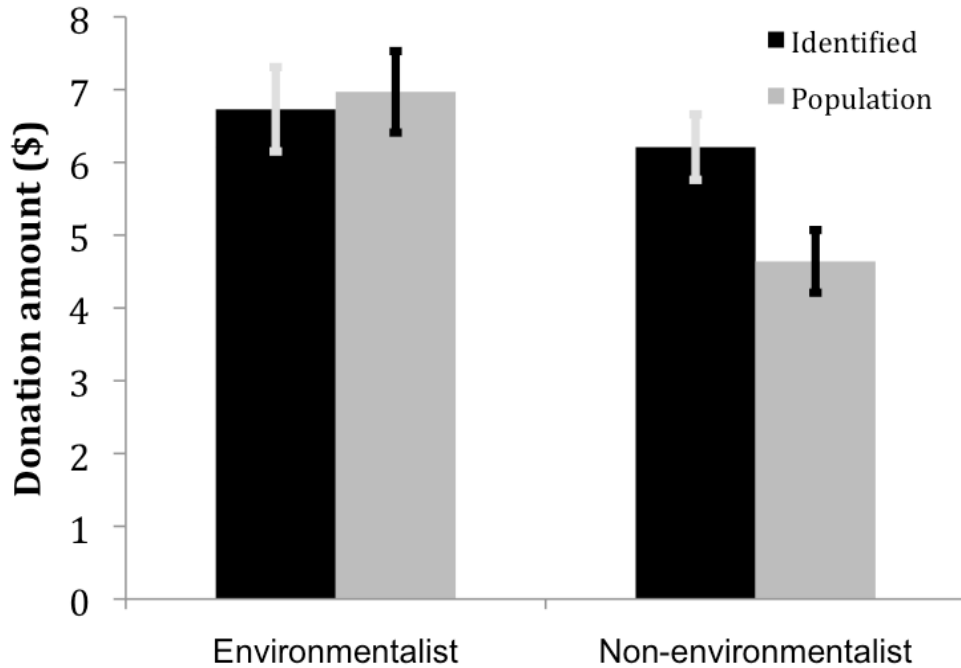


Figure 4.2. Shows results from Study 2: non-environmentalists donated significantly less to help all remaining polar bears (‘population’ condition) than they did to help a single polar bear (‘identified’ condition). Environmentalists donated similar amounts in the two conditions. Error bars show ± 1 standard error.

Results of Study 2 conceptually replicated and extended findings from Study 1. Thus, the study provided further and more persuasive evidence that compassion collapse emerges in the environmental domain, but only among non-environmentalists (again supporting our primary hypotheses). However, the conclusions that we can draw from these first two studies are tempered by the fact that the measures of compassionate decision-making we used in each were hypothetical (i.e., costless for participants). We

rectified this shortcoming in Study 3, in which participants were asked to make actual monetary donations.

Study 3

The first two studies demonstrated that for non-environmentalists, compassion towards non-human others is affected by the proportion of animals being helped and the identifiability of the victims. In Study 3, we held both the proportion of animals helped and the identifiability of the victims constant across conditions and examined how quickly the drop-off in compassion occurs as the number of animals in need of aid increases. Based on past findings (e.g., Kogut & Ritov, 2007) and the results of Studies 1 and 2, we predicted that helping behavior among non-environmentalists would begin to decrease as soon as there are two animals in need and continue to decrease as the number of animals increases. In contrast, however, we expected that environmentalists would not demonstrate compassion fade.

Methods

Participants

We recruited 171 undergraduate students (110 females, 61 males; 74% Caucasian, 26% other races) seated in public areas on the campus of a mid-sized public university in the northwestern U.S. Individuals participated in return for \$5. Eighty-seven (50.9%) self-identified as environmentalists and 84 (49.1%) did not.

Procedure and methods

Prospective participants were approached in various public spaces on a university campus by members of the research team. After determining their eligibility (i.e., they had not participated in Studies 1 or 2 and they were a student), participants completed a

brief, unrelated decision-making task in exchange for \$5. After completing the first task, participants were paid in single-dollar bills and told that the research team was collecting donations to support panda conservation on behalf of the World Wildlife Fund (WWF). Participants were then given one of three donation request letters and a blank envelope in which they were instructed to place any money they wanted to donate to the panda effort; at that point, the researcher explicitly moved away from the participant to further decrease any social pressure to donate.

In the ‘one panda’ condition, participants read about a single juvenile panda in need of aid; a picture of a panda was provided. Participants were told that any donation they made would go to help the panda. In the ‘two panda’ condition, participants read about and saw photos of two juvenile pandas. Participants were told that any donation they made would go to help both pandas. In the ‘eight panda’ condition, participants learned about and saw pictures of eight distinct pandas. Participants were told that any donation they made would go to help the eight pandas. In all conditions, the panda(s) were given ages and traditional Chinese names to increase identification; additionally, all participants read that feeding and rehabilitating the panda(s) was expensive and that local researchers were trying to raise \$2500 to help the animals. Thus, the total amount of need was kept constant across conditions. Materials are provided in Appendix C.

After participants made their donation decision, they handed the sealed envelope back to the experimenter; the amount found in the envelope (\$0-5) served as the dependent variable. Finally, participants filled out a very brief post-decision questionnaire, during which they indicated whether or not they identified as an environmentalist. All donations made by participants were in fact passed along to WWF.

Results and discussion

On average, participants donated \$2.87 to help the pandas; this average included the 16% of the sample who donated nothing. Donation amounts were subjected to a 3 (one panda vs. two pandas vs. eight pandas) x 2 (environmentalist vs. non-environmentalist) between-subjects analysis of variance. As predicted, a marginally significant interaction emerged, $F(2, 165) = 2.91, p = .06, \eta^2 = .03$ (see Fig. 4.3); there were no main effects, potentially due to the use of real as opposed to hypothetical donations and the fact that most individuals hold positive attitudes about pandas regardless of environmental identity. Among non-environmentalists, there was a marginally significant effect of condition, $F(2, 81) = 2.62, p = .08, \eta^2 = .06$. Planned contrasts revealed a significant linear effect of condition among non-environmentalists, $t(81) = 2.29, p = .03$, such that donations decreased as the number of pandas in need of aid increased; there was no quadratic effect present. Among environmentalists, no statistically significant differences emerged between conditions, $F(2, 84) = 1.12, p = .33, \eta^2 = .03$.

Thus, Study 3 again replicated and extended the findings from Studies 1 and 2, demonstrating that compassion fade emerges in the environmental domain only among non-environmentalists and even when real monetary costs are at stake. Moreover, Study 3 provided a more convincing test of the environmental compassion fade hypothesis by demonstrating a drop off in compassionate behavior as soon as the number of animals in need of aid increased beyond one. In addition, by keeping the number of victims small, maintaining the proportion of animals being helped constant (i.e., 100% of those mentioned), and identifying victims in all conditions, Study 3 was better able than the

previous two studies to rule out alternative, “rational” explanations of the observed decreases in compassion across the three studies (e.g., “drop-in-the-bucket” effects).

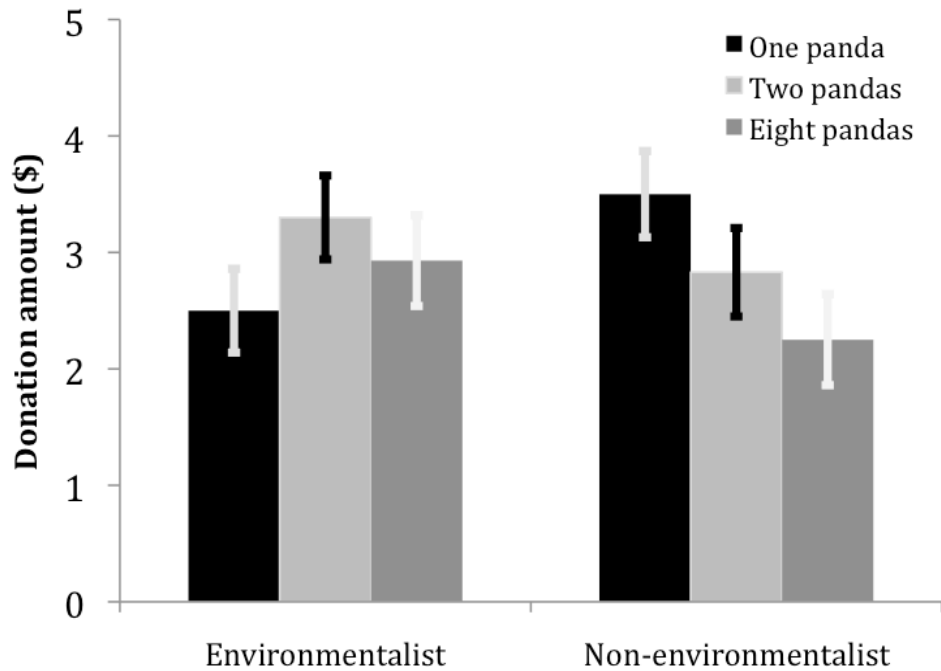


Figure 4.3. Shows results from Study 3: As the number of pandas in need of aid increased, non-environmentalists provided significantly smaller donations to a charitable group working on their behalf. Environmentalists’ donations did not differ significantly as a function of the number of animals in need. Error bars show ± 1 standard error.

Meta-analysis

To further examine the robustness of the observed moderation effect of environmental identity on compassion fade, we performed a meta-analysis across the three studies. Specifically, we examined the average effect size (Cohen’s d^1) across the three compassion fade paradigms, looking separately at environmentalists and non-environmentalists. To do so, we used the SPSS meta-analysis macro developed by Wilson (2005) to properly combine measures of effect size across studies, taking into account different sample sizes and variances (see also Lipsey & Wilson, 2001). As

expected, the average compassion fade effect was moderate in size and quite robust among non-environmentalists, $d = .43$ (95% CI = .22, .65), $Z = 3.91$, $p < .001$; in contrast, the average effect size among environmentalists did not differ significantly from zero (and in fact had a negative point estimate, indicating a small reverse compassion fade effect), $d = -.16$ (95% CI = -.43, .11), $Z = -1.14$, $p = .25$. These results confirm both the existence of compassion fade in the environmental domain as well as the moderating role of environmental identity.

General discussion

Across three studies, we found consistent empirical evidence of environmental compassion fade—compassion shown towards animals in need of aid decreased as the number of victims increased, identifiability of the victims decreased and the proportion of animals helped shrank. As predicted, however, the effect only emerged among self-identified non-environmentalists, people for whom environmental issues are relatively low in salience and personal resonance (Clayton, 2004). In contrast, individuals who reported a previously held, personally significant commitment to environmental protection (i.e., environmentalists) displayed similar levels of compassion regardless of the proportion (Study 1), identifiability (Study 2) or number (Study 3) of animals in need of aid. We conceptually replicated this moderation effect of environmentalism across three distinct paradigms (see Fetherstonhaugh et al., 1997; Small et al., 2007; Västfjäll et al., 2012), attesting to the robustness of the present results.

The observed moderation effect of environmentalism suggests that previous accounts of compassion fade are incomplete and in need of further development. Previously proposed mechanisms and moderating factors—including motivated emotion

regulation (Cameron & Payne, 2011), entitativity (Smith et al., in press), and singularity effects (Kogut & Ritov, 2005)—have not predicted that individual differences in commitment to a cause or personal identity should affect the emergence of compassion fade when helping victims is congruent with one’s commitments. At the same time, the neutralizing effects of commitment are likely consonant with at least some of these accounts. For example, environmentalists may be relatively immune to compassion fade because they view relevant victims as more cohesive (i.e., increased perceptions of entitativity) or else because they are more analytic in the context of hearing about environmental issues (e.g., due to greater knowledge of the problems facing animals in need). Another possible explanation is that environmentalists may simply view helping a greater number of animals as a more effective, meaningful and worthy undertaking (again suggesting a relatively more cognitive as opposed to affective approach to decision-making). Future research is clearly needed to determine how these various mechanisms interact with one another.

Broader implications

Given the scale of the environmental crises we currently face (cf., NRC, 2010), the emergence of compassion fade in the environmental context poses a challenge to policymakers, environmental advocates and others working to protect wildlife. Although we are encouraged by environmentalists’ apparent resistance to the potentially demotivating nature of environmental tragedies (Gifford, 2011), non-environmentalists’ susceptibility is worrisome. Effectively responding to the environmental challenges we face will require engaging a broad base of public support, one that extends well beyond the core environmental or “green” community (McKibben, 2010); because compassion

fade works to demotivate the very individuals and groups that still need to be engaged (i.e., non-environmentalists), it likely makes the task of building such coalitions that much more difficult.

The environmental problems we face involve large numbers of victims and this fact should not be hidden or downplayed by communicators. However, various strategies might be used to help individuals connect more effectively with these victims. For example, recent research suggests that compassion fade may be dampened by increasing individuals' perceptions that multiple individuals belong to a single, cohesive group (see Kahenman & Ritov, 1994; Smith et al., in press). Other possible strategies include using narrative to both prime environmentalist sentiments and individuate victims (Slovic & Slovic, 2004/2005), encouraging individuals to make initial low-cost commitments to environmental protection (which may situationally induce them to act as committed environmentalists do), and implementing interventions that increase direct contact with nature (Nisbet, Zelenski & Murphy, 2011). Further research is needed to examine the efficacy of these and other potential strategies.

Limitations

The present research has a number of limitations that should be addressed by future research. First, all three studies were conducted with undergraduate students attending a mid-sized public university in the northwestern U.S. Although past research on compassion fade has demonstrated that the effect emerges (in the humanitarian domain) among non-students and across numerous countries, future efforts should seek to confirm the present pattern of findings in other populations. This is particularly important given that moderating effects of environmental identity and commitment could differ

across settings. Second, the present series of studies does not fully distinguish between competing accounts of the compassion fade phenomenon (e.g., motivational vs. affective mechanisms). In a similar vein, the present work is unable to explain the apparent conflict between the observed findings and results from previous work, including Kogut and Ritov's (2007) in-group/out-group effects; further work is needed to resolve these conflicting findings. Similarly, future research must seek to explicate differences between the present results and those of Hart (2011)—in which the author found that information about harms to an entire population of animals generated more support for ameliorative climate change policies than information about harm to a single animal; such work will be particularly important with respect to informing the design of persuasive appeals in this domain.

Finally, the demonstrated moderation effect of environmental identity requires further attention, as it holds significant implications both for theory development and application. Although the current series of studies shows the effect of self-reported environmental identity to be a stable and critical moderator of compassion fade in this domain, we have not yet determined the underlying mechanism at work. Multiple possibilities exist. For example, it may be that the moderation effect was driven by the extent to which individuals identify with (non-human) victims, possibly shaping the strength of affective reactions. Alternatively, environmentalists' greater knowledge of the challenges facing wildlife (i.e., expertise), rather than their closer identification with animals in need of aid, may have driven the observed effects. Disambiguating these and other possible mechanisms may go a long way towards clarifying the drivers of compassion fade more generally.

Conclusion

Compassion fade poses a significant challenge to our personal and collective capacity to respond effectively to the many humanitarian and environmental crises we presently face (Slovic, 2007). Here, we have demonstrated that compassion fade emerges in the environmental domain, but only among those individuals who are less engaged with problems facing the environment. The present work highlights the critical need for further research into this disturbing yet potentially solvable barrier to greater compassion towards victims of circumstance and provides researchers in the field with a previously unstudied construct to explore. As we develop a better understanding of the underlying mechanisms that promote the emergence of compassion fade, our ability to effectively confront the phenomenon is similarly likely to grow.

Notes

1. Study 3 involved three groups (i.e., one vs. two vs. eight pandas). To calculate Cohen's d (which reflects the standardized difference between two means) for inclusion in the meta-analysis, I first computed the average mean and pooled variance across the two- and eight-panda conditions. Subsequently, I computed Cohen's d as the difference between the one-panda condition and the mean of the two other conditions.

CHAPTER V

CONCLUSION

The primary aim of this dissertation is to explore the role that affective and moral (psychological) mechanisms play in shaping individuals' engagement with the local and global environmental issues we face; a secondary aim is to begin uncovering individual-level and contextual factors that might moderate these effects. Although significant strides have been made in recent years to uncover the intra- and interpersonal forces that influence engagement with such issues (cf., Gardner & Stern, 2002; Kollmuss & Agyeman, 2002; Nisbet & Kotcher, 2009), relatively little work has explored the effects of affective and moral processes in this domain; even less research has explored the multi-level nature of these constructs. This is problematic in part because we know that such processes play an outsized role in shaping our interactions with one another, our perceptions of risk, and our daily decisions in many other domains (cf., Haidt, 2008; Slovic, Finucane, Peters & MacGregor, 2004). Thus, research on affective and moral motivators of and barriers to environmental stewardship—at both the individual and community levels—is critical if our goal is a more complete (and thus useful) model of human behavior in the environmental domain. This dissertation represents an attempt to begin addressing this gap in the literature.

Core findings

Across three distinct yet closely related projects, I found consistent evidence that individuals' willingness and ability to actively engage with environmental problems such as climate change, species loss and wilderness conservation are powerfully shaped by a

number of affective and moral psychological processes. For example, in Chapter III I showed a consistent relationship between feelings of gratitude and perceptions of responsibility towards future generations as well as between gratitude and willingness to act on behalf of future others. Similarly, in Chapter II I demonstrated that increased perceptions of moral obligation in the context of climate change positively predict intentions to perform proenvironmental actions. And in Chapter IV, I found that an over-reliance on affective cues and mechanisms can lead some individuals to demonstrate decreases in compassion towards animals in need, highlighting the potential limitations of affective mechanisms in motivating environmental stewardship (see also Smith, Faro, & Burson, in press). The fact that relatively few individuals identified climate change as an ethical issue in Chapter II similarly points to the potential limitations of the human moral judgment system in the context of large-scale tragedies (see also Gardiner, 2006; Jamieson, 2010; Markowitz & Shariff, 2012).

The research presented in this dissertation also revealed important individual-level and contextual factors that moderate the effects of affect and morality in the environmental domain. For example, in Chapter II I showed that beliefs about the causal structure of climate change shape individuals' perceptions of moral obligation, even though from a normative perspective such beliefs should play a minor role (if any) in affecting moral judgments (see also Ferguson & Branscombe, 2010). We know that such beliefs are highly constrained and influenced by group-level social processes (cf., Feldman, Maibach, Roser-Renouf & Leiserowitz, 2012)—for example, in the U.S., political ideology and identification are consistently strong predictors of climate change beliefs (McCright, 2009). Taken together, these findings highlight the fact that what are

often treated as purely individual-level phenomena are in fact critically influenced by forces that act at both the individual and group levels; this key conclusion, which is supported by the empirical findings from all three papers presented here, is one that has unfortunately not yet received wide recognition among researchers (particularly psychologists) working on these issues. This is extremely unfortunate, as the implications of such interactive effects for both our understanding of environmental stewardship as well as our ability to encourage such engagement (see below) cannot be understated.

Finally, a key takeaway point supported by the present research is that individual-, community- and societal-level efforts to increase public engagement with the environmental challenges we face are likely to falter or even fail if they ignore the complex effects that affective and moral psychological mechanisms have on shaping behavior. For example, efforts aimed at increasing compassionate environmentally-relevant behavior may be significantly hampered by phenomena such as compassion fade if the individuals and organizations responsible for creating behavioral interventions and advocacy campaigns fail to account for individuals' (and groups') affective and cognitive responses to environmental appeals. Moreover, as the research presented here and elsewhere makes clear, long-standing, intuition-driven assumptions about the motivators of and barriers to environmental engagement (e.g., knowledge about environmental issues) may, in many cases, be incorrect and misleading (see also Kellstedt, Zahran, & Vedlitz, 2008). Thus, the research presented in this dissertation adds to a growing body of research that has significant implications for the design of behavioral interventions, community engagement efforts and policy prescriptions (see Future Directions below).

Limitations

As discussed in each of the three papers, it is important to note some significant limitations of the research presented here. First and foremost, although the more than 2,500 participants included in this dissertation are quite diverse in terms of their personal characteristics and group memberships, all of the research was conducted with American adults and undergraduate students. Thus, it is critical to remember that the findings presented here may be, and in fact likely are (to some extent) geographically and temporally specific to contemporary American society. A more complete understanding of the role that affective and moral processes play in shaping environmental stewardship thus awaits more comprehensive cross-cultural research (see below).

A second limitation of the research is the heavy, though not complete, reliance on self-reported measures of environmental stewardship and engagement. Although numerous studies have demonstrated that self-reported environmental behavior and concern are strongly correlated with objective measures (cf., Gamba & Oskamp, 1994; Kaiser, Doka, Hofstetter, & Ranney, 2003), there will always be a concern that self-report measures produce biased responses due to impression management and social desirability effects. In a related vein, some of the present studies were hypothetical in nature, for example, asking participants how much they would hypothetically donate to support the national parks or polar bears in need of aid. At the same time, some of the study designs likely pointed participants' attention to certain topics or constructs (e.g., feelings of gratitude) in unusual or unnatural ways. Together, these study characteristics may have led participants to report different attitudes or perform different behaviors than they otherwise might have under more naturalistic conditions. Thus, fully understanding the

role that many of the constructs examined in this dissertation play in shaping actual behavior or support for various ameliorative policies awaits further research.

Finally, all but one of the present studies were conducted via internet, which not only affected the populations being sampled but also my ability to dig more deeply into the minds (and hearts) of my participants. Although there are clear benefits to internet-based data collection (i.e., large sample sizes), in-depth ethnographic methods clearly also have an important role to play in explicating the role of affect and morality in the environmental domain (see, e.g., Lertzman, 2009; Norgaard, 2011).

Future directions

The work presented in this dissertation has only begun to scratch the surface in terms of exploring the interactive effects of affective, socio-cultural and moral processes on (intergenerational) environmental stewardship. Thus, it is my hope that this work provides a jumping off point for further research at the intersection of psychology, ethics, culture and sustainability. Moving forward, I see at least three overarching directions for future research besides those described in each of the three papers: (1) further work exploring psychological mechanisms (particularly affective ones) that drive individual-level engagement with environmental issues (cf., Feinberg & Willer, in press; Smith et al., in press); (2) integrative, multidisciplinary research that examines how contextual processes and mechanisms (e.g., social construction of emotion; cultural norms and values; economic and legal structures; technological trends) interact with such psychological factors to shape individual- and group-level environmental decision-making; and (3) action-oriented research that informs the design of campaigns,

behavioral interventions and policies aimed at reducing environmental burdens left to future generations. I briefly describe each of these in more detail below.

Psychological research on environmental engagement

Research on the psychological predictors of individual-level environmental concern, beliefs and behavior has exploded in the past 10-15 years (Clayton & Myers, 2011), yet much work remains to be done. As discussed above, the papers that constitute this dissertation add to this growing literature in part by demonstrating the role that affective processes play in shaping whether and to what extent individuals take responsibility for future generations and non-human others. Unfortunately, relatively little extant research has examined such processes in much depth (but see Swim & Bloodhart, 2011 and Ferguson & Branscombe, 2010 for some recent exceptions); as a result, current models of environmental engagement are incomplete at best. Similarly, there is currently a lack of integrative work on individual- and community-level conservation efforts that brings together recent findings and models of decision-making from across various subfields within psychology, including social neuroscience and moral, political and developmental psychologies.

Building explicitly on the work presented here, one particularly important direction for future research will be to more explicitly trace the causal pathways by which individuals become engaged in long-term, large-scale environmental issues such as climate change or habitat destruction. In this dissertation, I have uncovered a number of distal and proximal factors that predict environmental stewardship and moral engagement in particular (Chapters II and III) as well as potential moderating variables (Chapters III and IV), but I have not yet developed a more comprehensive theoretical model of

individual-level decision-making. In fact, numerous attempts to map out behavior in the environmental domain have been made previously (e.g., Kollmuss & Agyeman, 2002; Stern, Dietz, Abel, Guagnano, & Kalof, 1998), yet none has done an adequate job of integrating many of the constructs studied in the present work (nor new findings from other subfields within psychology). Development of such a model will be particularly useful in supporting the other future directions for research discussed below.

Multidisciplinary research on environmental decision-making

In addition to further work explicating individual-level processes and mechanisms involved in environmental decision-making, there is a critical need for cross-level (of analysis), integrative research that explores the interactions between intra- and interpersonal factors. As I discuss in Chapter III, the role of affective processes, for example, gratitude, in shaping perceptions of responsibility towards and beneficent behavior on behalf of future generations may differ as a function of contextual factors such as cultural differences, group-level identities and economic constraints. Similarly, individual- and group-level factors that moderate phenomena such as compassion fade in certain contexts (Chapter IV) may have more or less of an effect in other settings or under different conditions. For example, the environmental compassion fade effects that emerged among non-environmentalists in Chapter IV may be weaker in cultures or communities in which there are strong social norms regarding donating to charity, which may overwhelm individual-level affective or motivational mechanisms. These and other “cross-level effects” point to the need for research that accounts for the fact that individual actors’ decisions are made under a variety of narrower and broader contextual constraints.

Although it is not the only way to get at these processes, multilevel cross-national research holds the potential to significantly further our understanding of public engagement with environmental issues (particularly large-scale, global ones such as climate change). It can do so by allowing researchers to empirically test three distinct types of theoretical hypotheses: individual-level (within nation/group), nation- or group-level, and cross-level. Such hypothesis testing is possible because we now have both the statistical tools to model all three types of effects as well as sufficient data (in some cases) at both the individual- and group-levels to ask interesting questions. For example, in research that I am currently conducting with Tony Leiserowitz, Anita Pugliese and others (Markowitz et al., in prep), we have been examining individual-level, nation-level and cross-level predictors of climate change threat perceptions (which are predictive of behavioral and political engagement, Bord, O'Connor, & Fisher, 2000). Using data collected at the individual level in over 100 countries, we are able to explore not only questions such as, "What is the effect of causation beliefs on perceived threat" or "How do country level carbon dioxide emissions predict threat perceptions," but also truly cross-level questions such as, "Does the previously demonstrated effect of gender on threat perceptions hold across all nations, and if not, do country-level factors such as gender equality help explain these differences?" Given the vast number of research questions that can be addressed when we begin to integrate different levels of analysis, it is critical that future research be strongly driven by theory (much of which is yet to have been developed in this context).

Intervention-oriented research

Finally, there is an obvious need for further intervention- and behavioral policy-oriented research in the environmental domain, as public engagement with the environmental issues we face remains extremely weak both within and beyond the U.S. For example, recent nationally representative polling conducted in the U.S. reveals that even those individuals who report the greatest amount of concern about climate change (so called “Alarmists”) remain woefully under-mobilized, with very few engaging in even basic pro-environmental personal and civic acts (Leiserowitz, Maibach, & Roser-Renouf, 2011). Although some significant strides have been made in recent years with respect to developing effective interventions in this domain (cf., Feinberg & Willer, in press; Goldstein, Cialdini & Griskevicius, 2008; Osbaldiston & Schott, 2012), there is a clear need for more effective and scalable programs and campaigns.

Future intervention research must, again, recognize the multi-level nature of environmental engagement and strive to integrate research across different levels of analysis. Ideally, future work will be able to draw on the types of integrative research called for above, as campaigns and interventions that aim to confront not only psychological *or* economic *or* cultural *or* political barriers to change but rather all four *together* are almost certainly going to be more effective. To take one example, advocates, policymakers and researchers interested in increasing rates of active transportation (walking and biking) need to consider not only infrastructural barriers (e.g., lack of sidewalks), but cultural (e.g., social norms regarding car use) and psychological (e.g., perceptions of risk) ones as well (Sirard & Slater, 2008; Yang & Markowitz, 2012).

Final thoughts

The research presented in this dissertation builds upon and adds to the rapidly growing and increasingly important multidisciplinary, social scientific literature on environmental stewardship. This body of research recognizes that confronting the environmental issues we face will require more than developing new technologies, setting the correct prices for (environmental) goods and instituting policies that regulate industry and consumption. Although all of those approaches are and will continue to be critical, it is clear that our stewardship efforts will fail if they are not supported by a more thorough understanding of the many psychological, social and cultural factors that influence individuals' and communities' engagement with environmental issues. It is my hope that the research presented in this dissertation moves us in this direction and, in the process, encourages others to continue exploring the role that affective, moral and social processes play in shaping environmental stewardship.

APPENDIX A

CODING SCHEME USED IN CHAPTER II

Development of coding schemes

As described in the chapter, three distinct coding schemes were deemed necessary for ‘ethicists,’ ‘non-ethicists,’ and ‘unsures’ given the essentially non-overlapping nature of the content produced across the three groups. The coding scheme(s) were entirely data-driven: working with a collaborator (not one of the two coders), I examined participants’ open-ended responses and generated an initial coding scheme for each of the three groups. For ‘ethicists,’ the codes were as follows: ‘stewardship/responsibility towards others/”should” do something’ ; ‘anthropogenic/human caused/human problem’ ; ‘harm caused’ ; ‘efficacy’ ; ‘restated’ ; ‘other/uncodeable.’ For ‘non-ethicists,’ the codes were: ‘not happening’ ; ‘naturally occurring’ ; ‘environmental/technical/scientific issue’ ; ‘lack of control/inefficacy’ ; ‘restated’ ; ‘other/uncodeable.’ For ‘unsures,’ the codes were: ‘lack of knowledge’ ; ‘unclear causation’ ; ‘restated’ ; ‘other/uncodeable.’ Given the data-based nature of the coding schemes that were used, future research using similar open-ended response methods will necessarily have to develop study-specific coding schemes.

Instructions to coders and coding procedure

Once the initial coding schemes were developed, I introduced the two coders (both of whom were blind to the hypotheses and aims of the present research) to the dataset and the coding schemes; we then went through a small number of open-ended responses (<5%) together as a group. Coders were then given approximately 20% of the data (proportionally split across the three participant groups/types) and instructed to code only the first codeable statement provided by respondents; in the vast majority of cases, only one codeable statement was provided. I then met with the coders again to discuss any disagreements. After establishing conventions for common responses, I gave coders another 25% of the data. Coding was again completed independently. I met one more time with the coders to discuss any remaining disagreements on a case-by-case basis. At that point, I provided coders with the remaining 50% of the open-ended data. I resolved all remaining disagreements between the coders.

APPENDIX B

MATERIALS USED IN CHAPTER III

Shared measures across studies

Present Affect

On a scale from 0 to 100, where 0 means you are feeling really terrible and 100 means you are feeling really great, how would you say you are feeling **right now**?

Move the slider to the left or right to indicate how you are feeling at this moment.

GQ-6 (trait gratitude)

Using the scale provided, please indicate how much you agree or disagree with the following statements:

1. I have so much in life to be thankful for.
2. If I had to list everything that I felt grateful for, it would be a very long list.
3. When I look at the world, I don't see much to be grateful for.
4. I am grateful to a wide variety of people.
5. As I get older I find myself more able to appreciate the people, events and situations that have been part of my life history.
6. Long amounts of time can go by before I feel grateful to something or someone.

Scale: Strongly disagree, moderately disagree, slightly disagree, neither agree nor disagree, slightly agree, moderately agree, strongly agree

Indebtedness-6 (trait indebtedness)

Using the scale provided, please indicate how much you agree or disagree with the following statements:

1. If someone saves your life, you are forever in their debt.
2. One should return favors from a friend as quickly as possible in order to preserve the friendship.
3. Owing someone a favor makes me uncomfortable.
4. As a rule, I don't accept a favor if I can't return the favor.
5. If someone pays for my dinner or invites me to eat at their place, I feel obligated to buy them dinner the next time or to invite them to eat at my place.
6. I get very upset when I discover I have forgotten to return something I borrowed.

Scale: Strongly disagree, moderately disagree, slightly disagree, neither agree nor disagree, slightly agree, moderately agree, strongly agree

Extra trait indebtedness items

1. I get overwhelmed by the thought of other people doing nice things for me.
2. I often feel I owe others for the good things I have in my life.
3. When someone does you a favor, you are obligated to repay them, even if you didn't ask for their help.
4. I feel indebted towards many people in my life.

Scale: Strongly disagree, moderately disagree, slightly disagree, neither agree nor disagree, slightly agree, moderately agree, strongly agree

Responsibility towards future generations

How much do you agree or disagree with the following statements:

1. My generation needs to look after itself first and worry about future generations second (reverse coded).
2. I'm willing to sacrifice in my own life (e.g., buy less stuff), if it will help people living in the future (assuming other people are willing to sacrifice as well).
3. People living today have an obligation to protect future generations, even if it means tightening our belts now.

Scale: Strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree

4. To what extent do you truly feel it is your personal responsibility to save resources for future generations, even if it means making do with less in your own life?

Scale: Definitely my responsibility, probably my responsibility, maybe my responsibility, maybe not my responsibility, probably not my responsibility, definitely not my responsibility

Policy support

Next, we'd like to ask you about your level of support for a number of possible policies that the U.S. government could choose to enact over the next year. The policies pertain to a wide variety of issues currently facing our country.

1. Increase taxes on gasoline by 25 cents per gallon and return the revenues to taxpayers by reducing the federal income tax; this would reduce our reliance on foreign fuels and decrease carbon dioxide emissions.
2. Reduce the national debt through a combination of cuts to government services (e.g., health care, transportation, defense) and increases in federal revenue (e.g., tax increases on the super rich).
3. Require every American citizen to obtain health insurance, either from the government or from private insurance companies.
4. Eliminate current tenure rules for K-12 teachers, making it easier to fire ineffective teachers regardless of seniority.
5. Increase enforcement of current immigration laws, making it harder for illegal immigrants to work and live in the U.S.
6. Maintain Social Security, Medicare and Medicaid benefits at current levels even if it means taking on a greater national debt.
7. Expand offshore drilling for oil and natural gas off the U.S. coast.
8. How much do you support or oppose requiring electric utilities to produce at least 20% of their electricity from wind, solar, or other renewable energy sources, even if it cost the average household an extra \$100 a year?
9. How much do you support or oppose signing an international treaty that requires the United States to cut its emissions of carbon dioxide 90% by the year 2050?

Scale: Strongly oppose, Moderately oppose, Slightly oppose, Slightly support, Moderately support, Strongly support

Climate change short beliefs measures

Do you think that climate change is happening?

Response: Yes, No, Unsure

Who do you think is most to blame for the problem of climate change?

Response: People living today; Past generations; No one, because it is naturally occurring; No one, because it isn't happening

Do you personally feel a moral obligation to respond to climate change (e.g., reduce your energy use)?

Response: Not at all obligated; A little bit obligated; Somewhat obligated; Very obligated; Extremely obligated

Overall, how concerned are you about the possible effects of global warming on...yourself; your children and grandchildren; people living in developing nations; future generations of people; plants and animals?

Response: Not at all concerned; A little bit concerned; Somewhat concerned; Very concerned; Extremely concerned

How important or unimportant is the issue of climate change to you personally?

Response: Not at all important; A little bit important; Somewhat important; Very important; Extremely important

Worldviews-12 (Kahan et al., 2007)

People in our society often disagree about how far to let individuals go in making decisions for themselves. How strongly do you agree or disagree with each of these statements?

1. The government interferes far too much in our everyday lives.
2. Sometimes government needs to make laws that keep people from hurting themselves.
3. It's not the government's business to try to protect people from themselves.
4. The government should stop telling people how to live their lives.
5. The government should do more to advance society's goals, even if that means limiting the freedom and choices of individuals.
6. Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.

Scale: Strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree

People in our society often disagree about issues of equality and discrimination. How strongly do you agree or disagree with each of these statements?

1. We have gone too far in pushing equal rights in this country.
2. Our society would be better off if the distribution of wealth was more equal.

3. We need to dramatically reduce inequalities between the rich and the poor, whites and people of color, and men and women.
 4. Discrimination against minorities is still a very serious problem in our society.
 - 5 It seems like blacks, women, homosexuals and other groups don't want equal rights, they want special rights just for them.
 6. Society as a whole has become too soft and feminine.
- Scale: Strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree

MFQ-30+2 (Graham et al., 2009)

When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using this scale:

[0] = not at all relevant (This consideration has nothing to do with my judgments of right and wrong) [1] = not very relevant [2] = slightly relevant [3] = somewhat relevant [4] = very relevant [5] = extremely relevant (This is one of the most important factors when I judge right and wrong)

1. Whether or not someone suffered emotionally
2. Whether or not some people were treated differently than others
3. Whether or not someone's action showed love for his or her country
4. Whether or not someone showed a lack of respect for authority
5. Whether or not someone violated standards of purity and decency
6. Whether or not someone was good at math
7. Whether or not someone cared for someone weak or vulnerable
8. Whether or not someone acted unfairly
9. Whether or not someone did something to betray his or her group
10. Whether or not someone conformed to the traditions of society
11. Whether or not someone did something disgusting
12. Whether or not someone was cruel
13. Whether or not someone was denied his or her rights
14. Whether or not someone showed a lack of loyalty
15. Whether or not an action caused chaos or disorder
16. Whether or not someone acted in a way that God would approve of

Scale: Not at all relevant, not very relevant, slightly relevant, somewhat relevant, very relevant, extremely relevant

Please read the following sentences and indicate your agreement or disagreement.

1. Compassion for those who are suffering is the most crucial virtue.
2. When the government makes laws, the number one principle should be ensuring that everyone is treated fairly.
3. I am proud of my country's history.
4. Respect for authority is something all children need to learn.
5. People should not do things that are disgusting, even if no one is harmed.
6. It is better to do good than to do bad.
7. One of the worst things a person could do is hurt a defenseless animal.
8. Justice is the most important requirement for a society.
9. People should be loyal to their family members, even when they have done something wrong.
10. Men and women each have different roles to play in society.
11. I would call some acts wrong on the grounds that they are unnatural.

12. It can never be right to kill a human being.
 13. I think it's morally wrong that rich children inherit a lot of money while poor children inherit nothing.
 14. It is more important to be a team player than to express oneself.
 15. If I were a soldier and disagreed with my commanding officer's orders, I would obey anyway because that is my duty.
 16. Chastity is an important and valuable virtue.
- Scale: Strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree

System justification, general

Please read the following sentences and indicate your agreement or disagreement on a nine-point scale.

1. In general, you find society to be fair.
2. In general, the American political system operates as it should.
3. American society needs to be radically restructured.
4. The United States is the best country in the world to live in.
5. Most policies serve the greater good.
6. Everyone has a fair shot at wealth and happiness.
7. Our society is getting worse every year.
8. Society is set up so that people usually get what they deserve.

Scale: Strongly disagree (1) to Strongly agree (9)

BFI-10

How well do each of the following statements describe you personally?

I see myself as someone who...

1. is reserved
2. is generally trusting
3. tends to be lazy
4. is relaxed, handles stress well
5. has few artistic interests
6. is outgoing, sociable
7. tends to find fault with others
8. does a thorough job
9. gets nervous easily
10. has an active imagination

Scale: Strongly disagree, disagree, somewhat disagree, somewhat agree, agree, strongly agree

Consideration of Future Consequences Scale

For each of the statements below, please indicate whether or not the statement is characteristic of you. Please keep the scale in mind as you rate each of the statements below.

1. I consider how things might be in the future, and try to influence those things with my day to day behavior
2. I only act to satisfy immediate concerns, figuring the future will take care of itself.
3. My behavior is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions.
4. I am willing to sacrifice my immediate happiness or well-being in order to achieve future outcomes.

5. I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years.
6. I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level.
7. I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time.

Scale: Extremely uncharacteristic, somewhat uncharacteristic, uncertain, somewhat characteristic, extremely characteristic

New Ecological Paradigm (short)

Listed below are five statements regarding the relationship between humans and the environment. Please indicate how strongly you agree or disagree with each one.

1. The so-called ecological crisis facing humankind has been greatly exaggerated.
2. The earth is like a spaceship with very limited room and resources.
3. If things continue on their present course, we will soon experience a major ecological catastrophe.
4. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
5. Humans are severely abusing the environment.

Scale: Strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree

Catch Question

Most modern theories of decision making recognize the fact that decisions do not take place in a vacuum. Individual preferences and knowledge, along with situational variables, can greatly impact the decision-making process. In order to facilitate our research on decision making, we are interested in knowing certain factors about you, the decision maker. Specifically, we are very interested in knowing whether you take the time to read the directions; if not, then some of our manipulations that rely on changes in the instructions will be ineffective. So, in order to demonstrate that you have read the instructions, please ignore the next two questions (leave all of the answer options for them unclicked) and write only the sentence "I read the instructions" in the textbox below the prompt for additional comments. Thank you very much.

Are people respected for helping others?

Response: Yes, No

To what extent do you feel respected by others when you donate to charity?

Not at all; Not very much; A little bit; Somewhat; A good deal; Very; Extremely

Demographics

Are you

Male; Female; Other _____ ; Decline to answer

What year were you born?

Please indicate your marital status:
Single, married/partnered, separated, divorced, widowed

Are you a parent?
Yes, No

Do you have any grandchildren?
Yes; No

Do you consider yourself to be an environmentalist?
Yes; No

Is English your native language?
Yes; No, my native language is _____

What country were you born in?

In which state do you currently reside?

What is your ethnicity? Check all that apply.
White/Caucasian, African American, Hispanic, asian, native American, Hawaiian/pacific islander, other

What is the highest level of education you have completed?
Less than High School; High School / GED; Some College; 2-year College Degree; 4-year College Degree; Masters Degree; Doctoral Degree; Professional Degree (JD, MD)

All things considered, how satisfied are you with your life as a whole these days?
Completely dissatisfied (1) to Completely satisfied (10)

In general, do you think of yourself as...
Extremely conservative, moderately conservative, slightly conservative, moderate, slightly liberal, moderately liberal, extremely liberal

On social issues, how would you characterize yourself?
Extremely conservative, moderately conservative, slightly conservative, moderate, slightly liberal, moderately liberal, extremely liberal

On economic issues, how would you characterize yourself?
Extremely conservative, moderately conservative, slightly conservative, moderate, slightly liberal, moderately liberal, extremely liberal

In terms of voting patterns, do you tend to vote...
Democrat; Republican; Independent; Green; Tea party; Other; No party/not interested

What is your religious identification (if any):
Protestant Christian; Catholic Christian; Evangelical Christian; Other Christian; Muslim;
Jewish; Hindu; Buddhist; Nonreligious (but not atheist); Nonreligious (atheist); Other
(please elaborate)

On a scale of 1-7, how religious do you consider yourself?
Not at all religious (1) to Strongly religious (7)

On a scale of 1-7, to what degree do you believe in a god or gods?
Not at all (1) to Completely (7)

What is your annual household income (give your best estimate)?
Less than \$30,000; \$30,001-60,000; \$60,001-90,000; \$90,001-120,000; More than
\$120,000

Study 2 unique measures (including manipulation)

Gas tax stimulus wording (all conditions)

Next, we'll ask you to read some information about a current policy issue confronting our representatives in Congress; after you've read the information, you'll be asked some questions about your opinion of what should be done. Please read the information carefully.

We are conducting comprehensive research to gather information on the issue of gasoline taxation. Many Americans believe that this is an important issue, as reflected in its prominent place in recent elections. The following is information relevant to the taxation of gasoline.

The federal gasoline tax is currently about 18.4 cents per gallon. In recent elections, several candidates were proponents of an increase in the gasoline tax while others were in favor of a temporary gas tax "holiday." There are several benefits associated with the taxation of gasoline:

(1) Trimming the national budget deficit: Increasing the tax by 50 cents over five years would produce over \$65 billion in new annual revenues and cut the national budget deficit by more than 5 percent. A gasoline tax would not entail the delays, red tape or costly bureaucracy associated with other types of taxes (such as oil-imports). A gas tax has the advantage of taxing consumption, rather than investment or work. In addition, economists have developed ways that the tax could be made equitable to all sectors of society.

(2) Reduce pollution & conserve natural resources: The gas tax would discourage modes of transportation such as personal vehicles and airplanes by making them more expensive. It has been estimated that with a 50 cent increase in the gasoline tax, the

average vehicle miles traveled (VMT) in the U.S. would drop from 9,500 VMT per year to 9,000 VMT per year and the average miles per gallon of American cars would increase from 27.5 mpg to 31.8 mpg. Combined, these two factors would bring about a decrease in both fossil fuel use and air pollution. The transportation sector accounts for more than two-thirds of total U.S. petroleum consumption. Last year the U.S. used 80 percent more oil in transportation than was produced in U.S. oil fields. In addition, transportation energy use is the nation's largest source of air pollution. For example, the transportation sector accounts for 32 percent of U.S. greenhouse gas emissions, and 67 percent of total carbon monoxide emissions.

(3) Improve national security: Our national security is increased by reducing dependency on foreign oil. On average, every American travels nearly 9,500 miles per year in a light-duty vehicle, and per capita VMT is growing again after recent decreases due to the recession. Rapid growth in heavy-truck and airline travel has also increased the demand for transportation energy. Most importantly, the transportation sector has not altered its virtually total dependence on petroleum. Experts note that the tax hike would reduce our strategically dangerous dependence on imported oil.

[Despite these virtues, the federal gas tax has only been raised three times in the past few decades. By international standards, the federal gas tax has been absurdly low since the 1930's. Between 1932 and 1983, the gas tax only increase from 1 to 4 cents per gallon. The choice of previous generations to keep the gas tax low has shaped our history and the opportunity to have a gradual relatively painless transition to a fuel-efficient economy has been diminished. Such a transition could have resulted in a cleaner environment, increased national competitiveness (increased production using less fuel) and greater national security (lower dependency on foreign fuel).] *negative past generations condition*

[The federal gas tax has been in effect since the early part of the century. It has been steadily increasing since its inception and has risen more dramatically (more than 400 percent) in recent decades. It has been providing revenue for federal programs and encouraging conservation since the 1930's. The choice of previous generations to have a gas tax has shaped our history and the opportunity to have a gradual relatively painless transition to a fuel-efficient economy has been enhanced. Without the tax, we would likely have a less fuel-efficient economy today.] *positive past generations condition*

[The federal gas tax was instituted by past generations in the 1930's. The choice of previous generations to have a gas tax has shaped our history as a country.] *control*

Although a portion of the benefits described above would be realized immediately, the majority of the benefits resulting from an increase in the gasoline tax would be enjoyed by those who belong to future generations. For example, without an increase in the gasoline tax, the supply of fossil fuel will probably last through our lifetimes, but will be depleted during the lifetimes of the next two or three generations. In addition, in the absence of an increased gasoline tax, pollution levels may be tolerable during our

lifetimes, but will become increasingly dangerous as they continue to accumulate in the future. Finally, each year we have a deficit, we leave an ever-increasing debt burden to be financed by future generations. The alternative to trimming our national deficit is an ever-increasing financial burden for ourselves and future generations that could eventually cripple the economy. The relationship between the increase in the gasoline tax and the benefits to future generations is roughly linear such that the greater the gasoline tax increase, the greater the benefits.

The primary disadvantage to an increase in the tax is clear: the price of transportation requiring fossil fuel will rise.

Given the relationship between the benefits to future generations and an increase in the gasoline tax, we are interested in how much of an increase in the gasoline tax you would be willing to support. This increase, of course, would be in addition to the current federal and state tax. For the purposes of this survey, assume that the burden of the tax will be distributed equitably on all sectors of society.

Gas tax dependent variables

What do you think is an appropriate federal gasoline tax increase? _____ cents.

Briefly explain how you made your decision using the space below.

Follow-up questions

The statements below refer to your thoughts and feelings while reading the gasoline tax increase survey you just completed. Please indicate the extent to which you agree with each of the following statements using the 7-point scale (1 = not at all; 7 = very much so) below.

1. Previous generations did their part to contribute to the common good by paying a reasonable gas tax.
2. Previous generations did their part to help manage the national debt, preserve resource, and avoid pollution.
3. Previous generations could have done more to contribute to the common good by paying a higher gas tax.
4. I feel thankful towards past generations for their choices.
5. I feel grateful for the actions of past generations.
6. I feel past generations acted fairly with respect to the gasoline tax.
7. I feel past generations treated my generation unfairly with respect to the gasoline tax.
8. I feel indebted to past generations for their choices.
9. I feel obligated towards future generations.
10. I feel responsible to protect future generations.
11. I feel appreciative of the actions of past generations.
12. I feel my decision was a fair one.
13. I felt empathetic toward future generations.
14. I was able to imagine future generations.
15. I felt an affinity toward future generations.
16. I understood the impact the gasoline tax increase would have on future generations.
17. The benefit to future generations from a gasoline tax increase was uncertain.

18. My potential sacrifice would guarantee benefit to future generations
19. I was unsure whether my potential sacrifice would benefit future generations.
20. The benefit to future generations from a gasoline tax increase was clear and unambiguous.
21. Future generations would begin to benefit from a gasoline tax increase in the near future.
22. Future generations would begin to benefit from a gasoline tax increase in the distant future.

Study 3 unique measures (including manipulation)

National parks funding scenario wording (all conditions)

Next, we'd like you to read a short article about the National Park Service. After you read the article, you'll be asked a series of questions about your reactions to the article. Please read the article as you would something that you saw in the newspaper.

U.S. National Parks facing long-term financial challenges

National Park Service spokespersons have released a report stating that while the agency has sufficient funding to keep the gates open at the 58 national parks it oversees in the near-future, the agency's longer-term prospects are not as positive. The NPS was established in the early 20th-century in the hope of maintaining a piece of the country's natural beauty and wonder for all future generations to enjoy and benefit from. In addition to running the nation's well-known national parks—including Yellowstone, Glacier, Yosemite and many others—the NPS also maintains hundreds of smaller national landmarks and other points of historical and natural interest.

[Unhelpful intentions past generations]

In part due to the harsh economic realities of their time (similar in some ways to the challenges facing the country today), the generation of Americans who established the national park system did not try to provide the NPS with sufficient funding to maintain the nation's parks in perpetuity. Instead, they left it up to present and future generations to bear the burden of funding the system moving forward. NPS spokespersons are now saying that the park system's charitable branch, the National Park Foundation, must reach out to individuals in order to raise the necessary funds to maintain the parks for future generations, particularly given a lack of political will in Washington D.C. to raise support for the system.

[Positive intentions past generations]

Despite the harsh economic realities of their time (similar in some ways to the challenges facing the country today), the generation of Americans who established the national park system tried hard to provide sufficient funding to maintain the nation's parks in perpetuity. Unfortunately, the funding they established was insufficient, leaving it up to present and future generations to bear the burden of funding the system moving forward. NPS spokespersons are now saying that the park system's charitable branch, the National Park Foundation, must reach out to individuals in order to raise the necessary funds to maintain the parks for future generations, particularly given a lack of political will in Washington D.C. to raise support for the system.

[Control]

As the report states, the NPS does not currently have sufficient funding to maintain the nation's parks in perpetuity, leaving it up to present and future generations to bear the burden of funding the system moving forward. NPS spokespersons are now saying that the park system's charitable branch, the National Park Foundation, must reach out to individuals in order to raise the necessary funds to maintain the parks for future generations, particularly given a lack of political will in Washington D.C. to raise support for the system.

Follow-up questions

Having just read this short article about the state of the national parks system, please tell us how much you agree or disagree with the following statements.

1. I feel that past generations treated my generation fairly with respect to providing funding to the national park system.
2. I am grateful to past generations for establishing the national park system.
3. I feel resentful towards past generations for underfunding the national park system.
4. I feel indebted towards past generations for their efforts to set up the national park system.
5. I feel my generation was treated unfairly by past generations.
6. I have a responsibility to support the national park system because of what past generations did for me.
7. I have an obligation to support the national park system.
8. I believe past generations tried to act in the best interests of future generations when they established the national parks.

Scale: Completely disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, completely agree

Donation Dependent Variable

As an extra thank you for participating in our study today, you will be entered into a lottery with a chance to win a \$100 bonus. Two participants will be selected at random to receive \$100 and will be notified. In addition, we would like to give you the opportunity to donate any portion of your potential winnings to the National Park Foundation, if you are selected for the lottery. You can allocate the \$100 however you want between yourself and the National Park Foundation (e.g., keep it all for yourself, give it all to the NPF, or choose some other split). The NPF is a charitable organization that works to support the national parks system in the U.S. If your participant ID number is selected for the lottery, we will make the appropriate allocation as you have indicated. Please tell us how much you would be willing to donate, if anything, to the National Park Foundation.

Response: Sliding scale from \$0 to \$100

National park policy preferences

How strongly do you support the following policies:

1. Increase funding for the national parks system via a small increase in federal income taxes (e.g., \$5 per person).

2. Close less popular parks if necessary to maintain National Park Service far into the future.

3. Allow some mining activities and timber harvest within national parks to provide new revenue for the system.

4. Raise entrance fees at national parks by 50-75% to provide more funds for the future

Scale: Strongly support, moderately support, slightly support, slightly oppose, moderately oppose, strongly oppose

APPENDIX C

MATERIALS USED IN CHAPTER IV

Study 1

Manipulated information and donation request

Approximately ten years ago, the population of wood storks (*Mycteria americana*) living on the coast of the southern U.S. were having significant breeding problems due to a lack of appropriate nesting habitat in local wetlands. To help the population, various citizen volunteer groups constructed hundreds of nesting platforms for the birds to use. Unfortunately, a recent hurricane that hit that area wiped out most of the nesting platforms that had been constructed, and now scientists are worried the local population of wood storks will be at risk again.



In response to the crisis, local volunteer groups are trying to raise money to rebuild some of the nesting platforms. Specifically, they hope to build 450 platforms (each platform costs approximately \$100 to build). Although 450 platforms won't accommodate all of the birds in the population because there are approximately 1,100 [25,000] wood storks in this area, these platforms will provide important breeding grounds for some of the affected birds. These volunteer groups are also trying to recruit volunteers from around the country to help build and install the new platforms.

Dependent variables

1. Assuming the volunteering were to take place during the summer when you didn't have any classes, how likely would you be to travel to the affected area and volunteer to build and install the breeding platforms?

Response: Not at all likely; a little bit likely; somewhat likely; very likely; extremely likely

2. How much would you consider donating to help this cause?

Response: \$0; \$10; \$20; \$30; \$40; \$50

Study 2

Identified animal

Please read the statement below and then answer the questions that follow. Try to rely on your gut feeling when answering the questions.

Imagine you've just found \$10 that you stuffed in a coat pocket last winter and then forgot about. Right after you find the cash, an individual working with the group 'Save the Polar Bears' hands you a donation request letter with the following message:

Hello! Our organization, Save the Polar Bears, is trying to raise money to help save Ralph the polar bear. Below is a picture of Ralph. With your help, we can save Ralph from the many threats he is currently facing.



Here is some more info about Ralph:

-Ralph is a 6 year old, young adult polar bear living in northern Canada; he lives part of the year on the ice and the rest of the year on land near Hudson Bay.

-Scientists are worried that Ralph may have a difficult time finding enough food to survive in the coming years, in part because there are not enough ringed seals for him to eat.

-Ralph is also currently threatened by retreating sea ice, the possibility of being illegally hunted, and the introduction of toxic chemicals into his habitat.

Ralph the polar bear needs your help! Your donation, no matter what size, will help our organization to protect Ralphs' habitat, prevent direct threats to him from industrial activities and conduct field research to find out what needs to be done to protect him. Please consider giving what you can to help Ralph.

Population

Please read the information below and answer the questions that follow. Try to respond quickly; rely on your gut feelings.

Imagine you've just found \$10 that you stuffed in a coat pocket last winter and then forgot about. Right after you find the cash, an individual working with the group 'Save the Polar Bears' hands you a donation request letter with the following message:

Hello! As you may have heard from friends or in the news, polar bear populations around the globe are showing serious signs of stress. Our organization, Save the Polar Bears, is collecting donations on behalf of the bears in an effort to improve their chances for survival. With your help, we can save these majestic creatures from extinction.



Here are some recent statistics about the bears:

-The world population of polar bears is estimated to be just 22,000, and scientists are worried that the species may have a difficult time sustaining itself in the future.

-Polar bear populations are currently threatened by retreating sea ice, illegal hunting and trading, and the introduction of industry and toxic chemicals into their habitats (e.g., oil and gas development).

-Recent and projected declines in one of the polar bears' main food sources, ringed seals, may cause widespread hunger and hardship for the bears.

The polar bears need your help! Your donation, no matter what size, will help our organization to protect critical polar bear habitat, prevent direct threats from industrial activities and conduct field research to find out what needs to be done to protect these animals. Please consider giving what you can to help these animals. Thank you!!

Dependent variables

1. How likely would you be to donate to this cause?

Response: Not at all; not very; somewhat; very; extremely

2. How much of your recently discovered \$10 would you consider donating?

Response:\$0; \$1; \$2; \$3; \$4; \$5; \$6; \$7; \$8; \$9; \$10

Study 3

One panda

Dear UO student,

Did you know that giant pandas are facing huge threats to their survival? Giant pandas are extremely endangered and need our protection. We are collecting donations from students at the University of Oregon on behalf of the World Wildlife Fund (WWF) to help protect these majestic creatures. Any money you donate will be given directly to WWF to help them with their panda conservation efforts. Before you decide how much you would like to donate, if anything, here is some more information.

Any money that you donate will go to protect pandas like Li Shan, a 4-year-old panda from the Gansu Province, China. Li Shan was orphaned and found by local researchers. She is being rehabilitated at a nearby panda reserve, but her medical and food costs are very high; right now, we are trying to raise \$2,500 to protect her. Her life and the lives of other pandas will be changed for the better as a result of your financial gift. With your support, and the support of other caring UO students, WWF will work to protect Li Shan.



Li Shan

Now that you have had the opportunity to learn about how any money you donate will be used, please consider donating to help Li Shan.

On behalf of the WWF, thank you!

Two pandas

Dear UO student,

Did you know that giant pandas are facing huge threats to their survival? Giant pandas are extremely endangered and need our protection. We are collecting donations from students at the University of Oregon on behalf of the World Wildlife Fund (WWF) to help protect these majestic creatures. Any money you donate will be given directly to WWF to help them with their panda conservation efforts. Before you decide how much you would like to donate, if anything, here is some more information.

Any money that you donate will go to protect pandas like Li Shan, a 4-year-old panda from the Gansu Province, China and Tuan Tuan, a 2-year-old panda from the Sichuan Province, China. Both Tuan Tuan and Li Shan were orphaned and found by local researchers. Both pandas are being rehabilitated at nearby panda reserves, but their medical and food costs are very high; right now, we are trying to raise \$2,500 to protect both of these pandas. The lives of these pandas, Li Shan and Tuan Tuan, and others will be changed for the better as a result of your financial gift. With your support, and the support of other caring UO students, WWF will work to protect Tuan Tuan and Li Shan.



Li Shan

AND



Tuan Tuan

Now that you have had the opportunity to learn about how any money you donate will be used, please consider donating to help Li Shan and Tuan Tuan.

On behalf of the WWF, thank you!

Eight pandas

Dear UO student,

Did you know that giant pandas are facing huge threats to their survival? Giant pandas are extremely endangered and need our protection. We are collecting donations from students at the University of Oregon on behalf of the World Wildlife Fund (WWF) to help protect these majestic creatures. Any money you donate will be given directly to WWF to help them with their panda conservation efforts. Before you decide how much you would like to donate, if anything, here is some more information.

Any money that you donate will go to protect pandas like Tuan Tuan (2 years old), Su Lin (3½), Mei Zhen (3), Lun Shu (5), Li Shan (4), Bing Di (1½), Hu Long (6) and Gao Shi (4). All of these pandas live in Gansu and Sichuan Provinces, China and are being rehabilitated at nearby panda reserves by local researchers. However, their medical and food costs are very high; right now, we are trying to raise \$2,500 to protect these pandas. The lives of these eight pandas and others will be changed for the better as a result of your financial gift. With your support, and the support of other caring UO students, WWF will work to protect these pandas.



Tuan Tuan



Su Lin



Mei Zhen



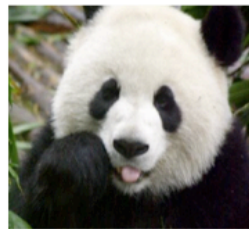
Lun Shu



Li Shan



Bing Di



Hu Long



Gao Shi

Now that you have had the opportunity to learn about how any money you donate will be used, please consider donating to help Tuan Tuan, Su Lin, Mei Zhen, Lun Shu, Li Shan, Bing Di, Hu Long, and Gao Shi.

On behalf of the WWF, thank you!

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Chapter V

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