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Eyes on the Stars and Feet on the Ground:

Creative tension and the role of affect in promoting action on climate change

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Abstract

This project explores how affect can play a role in promoting action on climate change via 'creative tension' – a concept borrowed from the organizational and social change literatures indicating the motivating force arising from the juxtaposition of *the world as it is* with *the world as it should be*. The project proceeds in two phases. In the first phase, the concepts of 'mitigation behavior,' the role of affect, and creative tension are examined and a conceptual model built upon them is produced. In the second phase of the project, the model is explored using two stages of fieldwork. A qualitative study assesses the accuracy and usefulness of the model by examining the behavior of a small group of Americans. The project then looks to the applicability of this model to the practical context of promoting mitigation behavior by examining ways in which practitioners currently use various components of this model. The results of this exploratory study support the relevance both of the primary components of the creative tension model – a climate-friendly vision of the future, the perception of one's values as relating to climate change, and the perception that the current path is inadequate – and of the role of affect in promoting mitigation behavior. Further research will be needed, however, to identify more precisely how these factors interact, particularly the connection between values and behavior.

Keywords: creative tension, behavior change, climate change, affect, visioning, emotions

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Keep your eyes on the stars and your feet on the ground.
-Theodore Roosevelt

1. Introduction

1.1. Problem Formulation: Climate change as a problem of human behavior

"The scientific evidence has now become overwhelming," begins a 2009 report issued by a broad group of climate scientists, "that human activities, especially the combustion of fossil fuels, are influencing the climate in ways that threaten the well-being and continued development of human society" (Richardson et al. 2009:6). "To stabilize climate," says another report, "a decarbonized global society – with near-zero emissions of CO_2 and other long-lived greenhouse gases – needs to be reached well within this century" (Allison et al. 2009:7). This "social transformation" will require not only deployment of renewable energy technology, but also a wide range of other changes, such as reduced material consumer demand, substantial increases in efficiency, and changes in how we manage biological resources, land use and agricultural systems (Richardson et al. 2006:27). To be successful, mitigation efforts will need to be coordinated at a global level, presenting considerable political challenges (ibid:20). As such, meeting the challenge of climate change requires not only changes in energy sources, but also changes in how our systems for meeting basic human needs function.

"Society already has many tools and approaches," the report continues, "to deal effectively with the climate change challenge" (ibid:26). But despite this technical knowledge, emissions continue to rise (ibid:6). Action, then, is not being taken by institutions and individuals at the scale that is necessary, despite increasing awareness (Allison et al. 2009:7). We should then seek to understand the human aspects of this systems change – not only why people are not acting, but what can be done to promote a change in behavior. Recognizing this need, a recent report released by the U.S. National Academy of Sciences has called for more research on "climate-related human behaviors" (Matson et al. 2010:3).

Such mitigation behaviors, as this paper calls them, are the common interest of academia and activists concerned with climate change mitigation. Studies within the behavioral sciences and related fields have begun to address various types of mitigation behavior from different perspectives (Lorenzoni et al. 2007; McKenzie-Mohr and Smith 1999; Swim et al. 2009; Weber 2006), but as will be explained, the practical value of this research varies. Several, mostly environmental and non-governmental, organizations (NGOs), have also recently started to include discussions of types of mitigation behavior and behavior change in their strategy documents and decision-making[1]. These academic and practitioner[2] discourses, however, have remained largely separate and contain many contrasting assumptions about the factors behind mitigation behavior.

1.2. Direction of project

This project will explore this varied conceptual landscape in order to understand how mitigation behavior[3] can best be promoted, focusing specifically on the role of affect and 'creative tension' in such behavior. It will ultimately conclude that in order to adequately address climate change, people should be encouraged to form climate-friendly visions of the future that they feel positively toward and to see the issue of climate change in terms of their values. Antoine de Saint-Exupéry is quoted as saying, "If you want to build a ship, don't herd people together to collect wood and don't assign them tasks and work, but rather teach them to

[1] See WWF 2008 and Futerra Sustainability Communications 2010 for examples.

[2] The term 'practitioner' will be used to refer to anyone who tries to promote behavior change. This includes people with formal roles in government, business and civil society, but also grassroots activists, community organizers, and other concerned citizens. This usage is intentionally broad, in recognition of the notion that insight about how behavior changes should be useful to anyone trying to enact change in the system. Various peoples' abilities to create leverage or redesign system components directly certainly differ, but strategies at all levels should be cognizant of the processes of behavior change.

[3] In this report, mitigation-related behavior is considered as distinct from adaptation-related behavior, based on the assumption that the mechanism behind each is likely different.

long for the endless immensity of the sea."[4] In other words, if you want other people to help you achieve a goal, you should get them to share your vision in a fundamental way. They have to be willing and eager participants, driven by a desire to affect change. Theodore Roosevelt issued complementary advice when he said, "Keep your eyes on the stars and your feet on the ground."[5] Meaning, aim for what you want, but don't lose sight of the current reality. This rather straightforward approach described by these quotes – of getting people 'on board' with a shared goal while staying aware of reality – is certainly not new, and might sound familiar to people who do political or social change organizing. But as will be explained in this project, it is a strategy that has arguably been sidelined in the discourse about action on climate change. Models of behavior change currently discussed in this context have extrapolated research from the behavioral sciences to support an emphasis on such factors as the barriers to behavior, the framing of the issue, incentives to behavior and on the perception of climate change as a risk – in other words, the tasks of ship-building. This project will take an alternate transdisciplinary approach and ultimately present the argument that instead of trying to figure out the best way to frame the question or incentivize ship-building, we should rather focus on the bright green future on the horizon.

1.3. Outline of report

This project progresses in two stages: a conceptual phase in which relevant ideas will be explored and a conceptual model will be built, and an empirical phase in which the accuracy and practical relevance of the model is examined. The report begins in Section 2 with an overview of the various aspects of methodology used in the project, specifically a transdisciplinary systems-based approach and a focus on the role of affect in decision-making. The conceptual phase of this report begins in Section 3 by clarifying the concept of 'mitigation behavior.' In Section 4, a neurobiological understanding of the role of affect in decision-making is presented and the implications of such a theoretical framework discussed. Section 5 begins by evaluating existing models and strategies for promoting mitigation behavior according to their consistency with this framework and concludes with the argument that mitigation behavior should be promoted via positive affect. The concept of creative tension will be explained in Section 6 and discussed in light of the role of affect. Building on this set of concepts, a conceptual model of mitigation behavior will be developed in Section 7. Proceeding to the empirical phase of this project, Section 8 will describe a qualitative study conducted to examine the accuracy and usefulness of the conceptual model. The practical applicability of this model to strategy for promoting behavior change will then be explored via a second phase of fieldwork examining organizational strategy in Section 9. The report concludes in Section 10 with a discussion of the practical and theoretical implications of this project as well as avenues for further research.

2. Methodology

A transdisciplinary and systems thinking approach will be taken in both stages of the project. Because this research builds the model that it then tests, the specific aims and methods used for the fieldwork will be explained at the beginning of those sections. This project departs from the understanding that there will be no 'silver bullet' in meeting the challenge of climate change. The task will require a staggering amount of work, from many actors, using many strategies and perspectives (Schneider 2009). But that is not to say that these strategies all have equal merit; this project also departs from the realist idea that strategies for promoting mitigation behavior should be compatible with and utilize scientific knowledge about human behavior.

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[4] This quotation is attributed to Antoine de Saint-Exupéry in many places, such as Maginn 2006. Von Stamm 2009 sources this quote to Saint-Exupéry's book *The Little Prince*, although Wikiquote.com currently sources this quote to the same author's "Citadelle" (http://en.wikiquote.org/wiki/Antoine_de_Saint-Exup%C3%A9ry).

[5] The original source for this quotation was also not found. It is attributed to Roosevelt in Krieger 2002.

2.1. Transdisciplinary systems-thinking approach

The methods used in this project were selected so as to recognize the relevance of transdisciplinarity and a systems thinking approach to the issue of climate change. Transdisciplinary research aims to consider issues from more than one viewpoint simultaneously, for the purpose of either tackling the epistemological challenge posed by the task or so as to make knowledge more useful for tackling social problems (Pohl 2005). Climate change is so wide-reaching that it is perhaps the ideal example of a problem necessitating a transdisciplinary approach. This project will take this approach by incorporating questions and knowledge from various fields. In *Thinking in Systems*, Donella Meadows writes that a "systems thinking lens allows us to reclaim our intuition about whole systems" and to "look for leverage points for change" (2008:6). To be true to this approach, this project will try to be mindful of how factors interrelate and will use terminology from systems analysis as a common language when incorporating knowledge from different disciplines.

Using these approaches allows for a project that is both use-inspired[6] and of theoretical or academic value. Such research could contribute to the discourse regarding human behavior, particularly the understanding of behavior change in the context of climate change, as well as allow insight that can be used by governments, organizations or businesses in designing effective strategies to promote mitigation behavior.

2.2. Critical realism and a neurobiological foundation

To pursue the aim of explaining mitigation behavior, this project has as its foundation a neurobiological understanding of human cognition centered on the role of emotions, or affect. This foundation in particular was chosen because it has garnered support and discussion within neuroscience and related fields as having significant scientific merit and because of its considerable philosophical and practical implications. Such a framework in general was chosen out of a desire to ground this investigation in a scientific understanding of the basic mechanisms of individual behavior.[7] This methodological choice was made not only due to the instrumental value of the particular framework, but also out of a realist conviction that the world – including social phenomena such as behavior – is in some way knowable, and such endeavors should therefore depart from what science knows of its mechanisms. The realism I refer to here is an indirect, critical realism, in which the world exists independently from our knowledge of it, but our knowledge is co-created by our minds and is fallible (Brown 1992:341; Carolan 2005:2). This realism shapes the project. This project of attempting to explain the mechanisms of human behavior, particularly those behind intentional behavior, is a self-consciously philosophical endeavor, and will be revisited throughout this report.

PART ONE: From Concepts to Model

3. Conceptualizing 'mitigation behavior'

The range of actions made by individuals in the name of climate change mitigation is huge, from recycling household waste to devoting one's career to policy activism. Such behaviors could be categorized in many ways, based on whether they are individual or collective, habitual or intentional, aimed at changing systems or not, etc. In one sense, this project uses an inclusive sense of the term 'mitigation behavior,' in that it groups together a range of behaviors under one umbrella instead of looking at a particular behavior, for example use of public transportation or voting behavior. This project does, however, narrow its focus to individual mitigation behaviors that are intentional and systems-changing in type. This section will explain these concepts as well as the reasons behind selecting them, so as to be precise

[6] See Stokes 1997 for a description of use-inspired research.

[7] In order to utilize behavioral science research, this project will use the lens of individual, rather than collective, behavior. Behavior that is collective in type, such as participation in policy-making or voting, will be seen as a composite of individual actions. See Callinicos 2004:xvi for a discussion of methodological individualism.

about the subject at hand. It will conclude with a discussion of the distinction between mitigation behavior and pro-environmental behavior.

3.1. A focus on intentional action

This project focuses on mitigation behavior that is intentional in the sense of being the product of willful, conscious decision-making that is goal-oriented.[8] This category is distinguished from behavior that is habitual or primarily the result of environmental or structural factors.[9] This focus can be arrived at via four lines of reasoning: one practical, one based on systems theory, one methodological and one epistemological.

The practical reason behind a focus on intentional behavior can be understood by considering the concept of 'behavior' using the distinction in the social theory literature between structure and agent (Lader 2005:182). From this, two senses of 'behavior' emerge, one focusing on likely outcomes or responses to external influences or circumstances, such as we describe how a system 'behaves,' and the other referring more to willful action on the part of an agent, or what we colloquially call 'action.' A focus on the external influences affecting behavior (the 'structure') is the necessary perspective of designers of policies or products, because they need to know how people generally behave in certain situations. While this line of research can be helpful in learning how people tend to act within certain structures, it by definition cannot provide insight about how or why people willfully act to *change* those structures, or how they otherwise act as agents[10]. A research program starting from this latter sense of behavior would focus on the internal, individual drivers of behavior as they relate to behavior based on intentional decision-making. It could be argued that the nature of problem of climate change is such that, to adequately address it, more people need to be actively engaged in mitigation action. From a practical perspective, even structural changes such as shifts in incentives require at least a certain number of more 'enlightened' individuals in power to enact change. Proponents of more democratic means of social change would say that because climate change is a humanity-wide problem, people should be actively engaged in trying to solve it. Either way, it seems that there would at least be instrumental value in producing a model of intentional mitigation behavior.

In *Thinking in Systems,* Meadows describes various kinds of leverage points for systems change and provides a ranking of their effectiveness (2008:145). Changing incentives, components, rules, information flows, and constants such as taxes can all be useful leverage points in various situations, but their power is relatively limited. "The most stunning thing living systems and some social systems can do," she says, "is to change themselves utterly by creating whole new structures and behaviors. In biological systems that power is called evolution. In human economies it's called technical advance or social revolution. In systems lingo it's called self-organization" (ibid:159). Even higher on this list of leverage points is the changing of system goals and paradigms. "The shared idea in the minds of society, the great big unstated assumptions," Meadows writes, "constitute that society's paradigm, or deepest set of beliefs about how the world works" (ibid:162). Paradigms are "the sources of systems" and from these "shared social agreements about the nature of reality, come system goals and information flows, feedbacks, stocks, flows, and everything else about systems" (ibid:163). People disagree as to

[8] Although the terms 'willful,' 'intentional,' and 'goal-directed' have slightly different uses in the literature, they will be considered in this report as indicative of the same concept.

[9] Although this distinction is commonly used in the literature (e.g. Ohtomo & Hirose 2007), it could be argued that it is conceptually incompatible to make within a systems-thinking frame, based on the idea that all actions or events must necessarily be the product of all precipitating causes (Oyama 2000). Also, an extensive discussion could be had here about various philosophical perspectives on the issue of free will or psychological theories about the relative influence of intrinsic and extrinsic factors on behavior. For the purpose of establishing some specificity, this project operates under the assumption that intentional, willful behavior does exists (at least as a matter of degree) and that it is relevant to climate change mitigation.

[10] See Callinicos 2004 for a discussion of agent vs. structure.

whether addressing climate change will require changes in goals or paradigms,[11] but this project assumes that changing such complex and far-reaching systems for meeting human needs, such as global agriculture or trade, requires more than the swapping out of components. Behind every material flow in those systems lie people and their actions. Essentially, these systems are our lives and livelihoods. So due to the scale of change necessary, the challenge then falls somewhere between social revolution and paradigm shift. Change of this sort happens in the minds of individuals, and at a systems level, if individuals are to be drivers or agents of change, they should be looked at as individual actors with agency. It would be therefore useful to have a focus on intentional behavior.

A methodological argument for such a project can be based on the observation that much of the existing research related to behavior change in the context of climate change has focused on how to change structures, such as taxes on carbon or other market mechanisms. For the sake of pursuing a diversity of potential solutions, an approach exploring other drivers of change, such as intentional action, could be fruitful.

The fourth justification for a focus on intentional action depends in part on the epistemological implications of a neurobiological understanding of human cognition, which will be explained in Section 4. This fourth argument will be returned to in Section 4.2.

3.2. Systems-changing behavior

This project is based on the idea that because the scale of the problem of climate change is so large, systems-level factors such as national and international policy frameworks, business models, governance structures and other aspects of social, technological, political and economic systems will need to be changed. As such, this project will pay particular attention to mitigation behaviors that are systems-changing in type, which broadly includes actions that are intended to change systems.[12]

Some strategies knowingly target low-investment or simple behaviors in the hope that they will be the 'gateway' to other, more significant actions. A report published by the British government's Department for Environmental, Food and Rural Affairs (DEFRA), for example, recommends that it should "promote a range of behaviors as entry points in helping different groups to make their lifestyles more sustainable – including catalytic (or "wedge") behaviors if identified through research" (2008:22). Research on these 'spillover' effects show mixed results, but the majority of the studies seem to question their effectiveness[13]. It would then be sensible from the perspective of strategy to have a model that pays particular attention to systems-changing behavior directly.

Defining precisely what is or is not within the category of systems-changing behavior is impossible, particularly considering that the separation could be drawn based either on behavioral intentions or outcome. The conceptual distinction is worthwhile, however, particularly in the context of developing strategy for promoting action on climate change. If the behavioral science literature only examines behaviors that together would not amount to effective climate change mitigation, the practical value of such research is questionable. That being said, the existing literatures examine behaviors that spans the range between systems-changing and trivial. In order to be able to build upon such research, the conceptual part of this project will rely on a broader definition of mitigation behavior. In Part 2, this focus will be parsed to allow a discussion of behavior that is systems-changing in type.

3.3. 'Mitigation behavior' as a category

Investigating multiple behaviors together is uncommon for studies within the behavioral sciences, where an effort is made to consider the antecedents of isolated behaviors.

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[11] See Dobson 2007 for an overview of various positions on this issue

[12] This idea that climate change must be addressed at the systems level can be found in the sustainability science literature (Fiksel 2006) as well as in some popular media (http://www.worldchanging.com/archives/010947.html).

[13] See Compton and Thørgersen, 2009 for an overview of existing research published by the WWF.

So why consider such a wide variety of behaviors as a single concept? One reason has to do with the transdisciplinary approach of this project. Many terms exist within the fields explored in this research to explain different types or aspects of behavior. While having the benefit of precision within a discipline, these categorizations can make cross-disciplinary discussion difficult. In order to be able to build on existing literatures within multiple disciplines, a broad focus is helpful, if not necessary.

It could also be argued that within intentional action, different particular behaviors are likely motivated by the same mechanism. In other words, if you are concerned about climate change do something to try to mitigate it, your motivation is the same, no matter which action you choose. Your choice of action might have more to do with the beliefs you hold regarding the type of change that is necessary, or where you fall on the spectrum of green political thought (Dobson 2007). In the terms of agent and structure used above, if the focus of this project is on internal drivers of behavior that are robust across different structural contexts, it would consistent to develop a conceptual model that can explain the behavior of the agent across these various situations.

From a practical perspective, developing a conceptual model that can explain a range of behaviors could have an advantage over one that can only a single behavior, in that it could be more broadly applied, therefore possibly requiring fewer resources and less direct prompting.

3.4. Mitigation behavior vs. pro-environmental behavior

Much of the behavioral sciences research addressing climate change, particularly in the field of psychology, has explored behaviors related to the issue through the lens of 'pro-environmental behavior,' either directly or indirectly (Swim et al. 2009:73). While mitigating climate change is certainly a goal that is beneficial to the environment, it should arguably remain methodologically distinct from this category. Many pro-environmental actions, such as the protection of endangered species or fresh water resources, are not directly related to climate change mitigation, and conversely, mitigation can be done for a variety of reasons, only some of which could be categorized as 'environmental' in the traditional sense. In its report on how psychology can contribute to the problem of climate change, the American Psychological Association notes that two main rubrics for understanding pro-environmental behavior have guided the field's research. The first line of research includes an assumption of self-interest pursuit as understood in Cartesian terms, and the other sees pro-environmental behavior as inherently altruistic (ibid). These altruism-based theories are rooted in a view of the global environment as a commons and largely see the environment as the object of peoples' altruism (ibid). The issue of climate change arguably leaves room for motives that are more anthropogenic than this environment-minded altruism, such as concern for people. So while the pro-environmental behavior literature surely contains research that could be useful in investigating mitigation behavior, it cannot be wholly applied to the development of a mitigation behavior model without closer examination. Such a thorough review would be a worthwhile pursuit, but is outside the scope of this project.

4. The Role of Affect

As mentioned earlier, the conceptual work of this project is based on a neurobiological understanding of the role of affect in human cognition. This section will explain the prevailing view of affect from the field of neuroscience as well as some implications of this theory. This theoretical framework will later be used to evaluate models and strategies currently being used to promote action on climate change and as a foundation for the conceptual model developed in Section 7.

4.1. Damasio's theory

By conducting experiments with patients with lesions in various parts of their brains, Antonio Damasio and other neuroscientists have gained knowledge about the roles these brain regions have in our cognition and behavior. In his book *Descartes' Error: Emotion, Reason, and*

the Human Brain, Damasio describes how he first realized the importance of emotion to our decision-making while studying a particular patient:

> The instruments usually considered necessary and sufficient for rational behavior were intact in him. He had the requisite knowledge, attention, and memory; his language was flawless; he could perform calculations; he could tackle the logic of an abstract problem. There was only one significant accompaniment to his decision-making failure: a marked alteration of the ability to experience feelings. Flawed reason and impaired feelings stood out together as the consequences of a specific brain lesion, and this correlation suggested to me that feeling was an integral component of the machinery of reason. (Damasio 1995:XII)

Since then, Damasio and others have explored this correlation through studies of impaired and unimpaired people in various decision-making situations.

Later in the same book, Damasio (2004) uses these findings to outline a theory of the role of affect in decision-making. He separates emotions and feelings, the former being automatic, mostly physical responses and the latter the conscious experience of some derivation of pain or pleasure as occurs privately within our minds. Both are components, Damasio argues, of our mechanisms for maintaining self-regulation, or homeostasis (ibid:166). Emotions precede feelings, both in the experience of the individual and in evolutionary history, and occupy the top of a tree-shaped model of self-regulation (ibid:80). Each level of this model describes mechanisms that regulate aspects of functioning. From the ground up, the processes become less automatic and more abstract. Feelings occupy the uppermost level, above emotions-proper.

Because feelings emerged out of previously-evolved self-regulation systems built around the various neural networks of the body, Damasio claims, the mechanism behind them evolved using the components of this existing neural structure. Put simply, the brain maps out the status of the body based on signals from all levels of the aforementioned 'tree.' In humans, these maps consist in part of images, broadly defined to include sensory impressions and cognitive ideas, which are encoded by experience to have degrees of positive or negative emotional content (ibid). When presented with an emotionally-competent stimulus, images corresponding to that stimulus are in a sense activated, along with the corresponding emotion. This entire process happens very fast, ahead of selective attention, and can even take place entirely under the radar of consciousness, as in animals (ibid:60). After the stimulus is detected in this way, "attention and proper thought *can be diverted* to those stimuli" and begin a process of conscious appraisal or deliberation (ibid:61). Feelings are the perception of various configurations of these body maps, and serve as salient, usable input into our cognitive processes (ibid:86). In addition to external stimuli, conscious thoughts can also trigger this map-encoding process. And as nearly any type of stimulus is emotionally-competent to some degree, this mechanism is an ongoing layer of our cognition.

Returning to the homeostasis-seeking role of feelings, Damasio states that they are the "mental manifestations of balance and harmony, of disharmony and discord" and help to guide us toward situations that will enhance our well-being and away from those that will not (ibid:139). They allow us to feel, or intuit, the potential value or threat posed by a stimulus without the need for constant conscious deliberation. When we make normal decisions, we draw upon our emotion-infused repertoire of thoughts and images to assess possible outcomes. In this way, emotions do not stand separate from our rationality, but are instead an infused component of it.

This is not to say that emotions *always* lead us along an optimal path. "We humans, conscious of the relation between certain objectives and certain emotions," Damasio writes, "can willfully strive to control our emotions, to some extent at least." In doing so, we are "in effect exerting some control over the life process and leading the organism into greater or lesser harmony," thus "overriding the tyrannical automaticity and mindlessness of the emotional machinery" (ibid:52).

Although "mindless" in the technical sense of the term, automatic appraisals "are the real value of emotions: their largely intelligent connection between the emotionally competent stimulus and the set of reactions that can alter our body function and our thinking so profoundly" (ibid:54). Removing appraisal from the definition of emotions would also "render the biological description of the phenomena of emotion vulnerable to the caricature that emotions without an appraisal phase are meaningless events. It would be more difficult to see how beautiful and amazingly intelligent emotions can be, and how powerfully they can solve problems for us" (ibid). In this way, normative judgments or appraisals of the world around us are at least partially made by this "automatic machinery."

4.2. The implications of affect

The implications of this embedding of emotions into rationality are far-reaching and have bearing on many types of human endeavor. If emotions are embedded into rationality for the sake of promoting well-being, they cannot be dismissed as categorically inferior to, or even truly separate from, analytical reasoning. Our concepts of true and false knowledge, then, must account for this observation. If automatic emotional appraisals contain legitimate normative judgments, our concepts of right and wrong must also accommodate. If "feelings of pain or pleasure or some quality in between" are indeed the "bedrock of our minds," as Damasio claims (2004:3), then ignoring the role of affect is futile and appeals to emotion should be taken seriously[14].

Referring to an understanding of human cognition based on the role of feelings, Damasio wrote, "The success or failure of humanity depends in large measure on how the public and the institutions charged with the governance of public life incorporate that revised view of human beings in principles and policies" (Damasio 2004:8) At another place in the same book, he describes his hope that, "Science can be combined with the best of a humanist tradition to permit a new approach to human affairs and lead to human flourishing" (283). It is in this regard that a true understanding of the role of affect should recognize feelings not just for their instrumental value as instigators of behavior, as manipulative buttons to be pushed, but as the *lived experience* of good and evil, of truth and falsehood. As such, the ways in which we seek to engage each other at the level of feelings also carry with them such normative and epistemological weight.

The "success or failure of humanity" is undoubtedly at stake with the issue of climate change. It tests our ability to reorganize our society, and therefore our ability to get people to act in different ways. As such, it implicitly poses a question regarding human nature and ethics. If feelings are so embedded in the very fabric of our cognition, then purely analytical arguments are ineffective and scare tactics are unethical. The only justifiable and effective way to promote mitigation behavior, then, is to engage people as willful actors. In other words, it is not only of practical use, but also of moral necessity that people should become mindful, active participants in this task of reorganization. Continuing from the discussion in Section 3.1, this is the fourth argument for developing a model of intentional behavior for climate change mitigation.

5. Existing Models and Strategies

Within the last decade, Damasio's theory about the role of affect in decision-making has become the foundation for a range of research within neuroscience and the behavioral sciences (Bechara 2007; Nooteboom 2007; Marinier & Laird 2004; Power & Dalgleish 2008:46; Slovic et al. 2006). Findings from this research, however, have not readily carried over into innovation in how policies or strategies are designed for engaging people with climate change. This section will briefly review common strategies for promoting mitigation behavior along with the models that (implicitly or explicitly) underlie them. For conceptual clarity, the review will be organized

[14] Alternative conceptions of emotions certainly exist (see Oatley et al. 2006 for an overview), and Damasio's theory is not without detractors (Pansksepp 2003). But for the sake of brevity, this paper does not examine these other theories.

according to basic forms of these models. The focus of this discussion will be both theoretical and practical.

5.1. Basic Cartesian model

When campaigns first emerged in the 1970s encouraging pro-environmental behavior, they assumed a simple 'information deficit' model, in which environmental knowledge caused environmental attitudes, which in turn inspired pro-environmental behavior (Burgess et al. 1998:1447). This basic linear conception has repeatedly been found to be inadequate to explain behavior (Lorenzoni et al 2007:446), and strategies based on this model have proven unsuccessful, except in cases in which a lack of information is identified as the only barrier to changing an easy, low-cost behavior (Gardner and Stern 1996:80). Despite this, many non-governmental organizations (NGOs) and governments use a strategy based on this approach in the hopes that increased knowledge and a shift in attitudes will cause a change in behavior (Kollmuss & Agyeman:241).

This basic model depends on the assumption, descending from Rene Descartes, that analytical reasoning is separate from and superior to the emotions, and therefore right behavior arises from such detached contemplation (Devlin 1996:346). In addition to being ineffective, then, strategies based on this model are also clearly incompatible with an understanding of the role of emotions.

5.2. Expanded Cartesian models

Other early models, such as the theory of planned behavior, expanded upon this basic model to incorporate additional social or environmental factors (Kollmus & Agyeman 2002:242). Interventions based on these models focus on providing incentives (financial or otherwise) or on reducing barriers to behavior. More recent incarnations of these models can be found in popular books such as *Nudge* (Thaler & Sunstein 2008), and to a lesser degree, *Switch* (Heath & Heath 2010). The authors of *Nudge*, for example, argue that since much of modern society is 'designed' anyway, those in a position to do so should design default settings and interfaces so as to promote behavior that benefits society. A similar claim is made by Dan Lockton with his project *Design with Intent: Using design to influence behavior*[15]. Although such design principles could surely be helpful to those in the position of designing user interfaces, their utility is limited to types of behavior that are more easily influenced by structural or environmental factors. As discussed earlier, not all behaviors that are necessary to mitigate climate change fit within this category.

Recent social science studies of behavior related to the environment and climate change have often addressed barriers to behavior change (Kollmuss & Agyeman 2002; Lorenzoni et al. 2007; Swim et al. 2009). These interventions focusing on removing barriers assume that if the barriers were removed, people would act in accordance to their true attitudes or intentions. Although many such strategies do not specifically outline this, a conventional Cartesian conception of rationality is typically an implicit assumption.

5.3. A non-model

In *Fostering Sustainable Behavior* (1999), Doug McKenzie-Mohr outlines the approach of community-based social marketing, which uses methods borrowed from the field of marketing, such as focus groups and surveys, to identify ways to target specific target behaviors. The rationale used is that if people cannot be relied upon to act in accordance to their attitudes, efforts should be directed away from changing those attitudes and toward whatever strategies prove to be effective in changing a target behavior. Strategies, such as establishing social norms or obtaining commitments from participants, are then used and evaluated. While this approach can be effective at changing specific behaviors in communities, such as participation in recycling programs, its usefulness outside the scope of low-investment behaviors is questionable (Peattie & Peattie 2009). More significantly for this project, it does not present a model of behavior,

[15] See http://architectures.danlockton.co.uk/

much less one that incorporates an understanding of the role of affect or could be used to understand intentional action.

5.4. Risk aversion and beyond

Much of the research within the behavioral sciences that focuses specifically on how to promote mitigation behavior emerges at the intersection of economics and psychology, in the field of decision sciences. This research focuses primarily on peoples' perception of climate change as a risk. According to the risk-as-feeling hypothesis (Lowenstein et al 2001), which builds in part on Damasio's model, emotional reactions to risky situations often drive behavior when such reactions diverge from more knowledge-based cognitive appraisals. In other words, when confronted with a risk, we tend to act based on how we feel, rather than what we judge to be the best course of action. So to accurately assess a risk, it needs to be affectively salient to us. This poses a problem in the context of climate change, because "the time-delayed, abstract, and often statistical nature of the risks of global warming does not evoke strong visceral reactions" (Weber 2006:103).

The direct application of this finding would amount to using scare tactics or threatening scenarios in an effort to make the potential effects of climate change more negatively charged in peoples' minds. Environmental NGOs have indeed used images of stranded polar bears and cracked deserts in their appeals, and feature films such as *The Day After Tomorrow* (2004) and *Age of Stupid* (2009) have depicted such doomsday scenarios. There are several problems with this type of strategy and model, both practical and theoretical. The same line of research that says that climate change should be made more salient issues a caveat regarding the drawbacks of emotional appeals, saying that people can easily get desensitized to them (Center for Research on Environmental Decisions 2009:20). As such, the takeaway value of this type of strategy advice is limited, as the demarcation between the right and wrong ways to promote change is not clear. The theoretical argument against strategies that use negative feelings as a point of leverage refers back to the discussion in Section 4.2. If feelings are the lived experience of good and evil, knowingly trying to 'push the buttons' of negative emotions is tantamount to intentionally inflicting pain, which could be seen as morally questionable.

It could be argued that the same issues of scale, delay, and distance that Weber describe as complications preventing climate change from being effectively felt as a risk are reasons that the issue should be examined within a different paradigm. If we're not feeling the risk, and making it salient is tricky, then maybe we should explore the role of other emotions in promoting behavior change. Specifically, the role of positive emotions seems underexamined in the literature. And since positive emotions tap peoples' desire for flourishing, or homeostasis with well-being, they might be better long-term motivators of behavior.

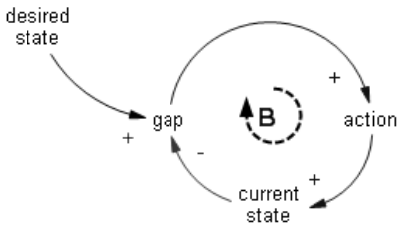
So within the context of climate change mitigation, how could practitioners engage peoples' positive emotions? In the spirit of the use-inspired aim of this model, this question will be addressed by incorporating knowledge from the fields of organizational change and social movement studies, recognizing that the experiential knowledge from these fields could provide insight as to how to promote action. A common theme from these fields, creative tension, will be examined, followed by a discussion of its compatibility with an understanding of the role of affect. From there, a conceptual model will be drafted based on an integration of this idea of creative tension and a review of relevant behavioral science literature.

6. Creative Tension

In his "Letter from Birmingham Jail," Martin Luther King, Jr. wrote, "Just as Socrates felt it was necessary to create a tension in the mind, so that individuals could rise from the bondage of myths and half-truths, so must we… create the kind of tension in society that will help men rise from the dark depths of prejudice and racism" (1963). In *The Fifth Discipline*, Peter Senge references this quote and introduces the term "creative tension" to describe a state within an individual or group in which "the gap between vision and current reality" serves as "the source

of creative energy" (Senge 1990:150).[16] What is created through creative tension is change, or progress toward the desired vision of the future. The main elements of this tension then, are a desired vision of the future and knowledge that the current state of affairs is different from that vision.

Within systems thinking, there is a common system archetype for goal-seeking behavior that mirrors the basic dynamic behind creative tension:



In this causal-loop diagram (CLD), the gap between the current state and the desired state leads to action. This action, in turn, brings the system closer to the desired state. Without interference, the gap will decrease over time and result in the desired state. This basic model can be used to describe any situation in which action is taken for the aim of attaining a certain desired state (Meadows 2008:29).

6.1. Creative tension in organizational change

Organizational change literature might seem like an unlikely place to look for theories of change, given this investigation's focus on individual agency rather than structure. Even though this literature does discuss how to manage change in the context of businesses and other organizations, much of it emphasizes this precise point – that to be self-sustaining, organizational change requires a shift in organizational culture, not just outside pressure (Doppelt 2003:74).

Three change models that have been identified as "exemplars" in the organizational change literature incorporate the main aspects of creative tension outlined above (Mento 2002:45). In Kotter's 1995 "strategic model for transforming organizations," three of the eight steps have to do with creating, communicating, and empowering people to act on a vision (quoted in Mento 2002:47). Jick's "ten steps for implementing change" starts with an analysis of the organization's need for change and continues to the creation of a "shared vision and common direction" (ibid). General Electric's change model advises management to "ensure everyone understands [the] need for change" and to shape a vision in which everyone sees "desired outcomes in concrete behavioral terms" (ibid). An article providing an overview of these models (ibid:49) also describes how when people are driven only by wanting to escape an undesirable status quo, the motivation is external and therefore wanes as the situation improves. With creative tension, however, the motivation is more intrinsic (ibid).

In his book *Leading Change toward Sustainability*, Bob Doppelt highlights the importance of visions that "provide an absorbing positive image of the future" (2003:130). Negative or backward-looking purposes, such as goals to be 'in full compliance with the law' or 'minimize impacts' are not motivating because they "tell people what not to do – what to avoid" (ibid). "Effective visions," by contrast, "focus on something new and important that people can create. Thus, they are positive images that capture the imagination, expand possibilities and motivate people" (ibid). They "simultaneously abolish old perspectives that steer an organization away from sustainability while forming new perspectives and thought patterns that align people with the desired state of sustainability" (ibid).

[16] 'Creative' is used here in the original sense of 'having the ability to create,' rather than the more common meaning of being inventive or artistic.

By describing vision as a "simple, lucid and compelling picture of a future condition that people feel committed to achieve," Doppelt emphasizes the motivational or driving aspect of visions. They are not only positive images that people passively have a positive association with, they are goals that they feel compelled to work toward. Although some of this literature does not mention creative tension specifically, the concept is compatible with the way in which visions are commonly described within it.

6.2. Creative tension in social movements

Marshall Ganz, who worked as an organizer with Cesar Chavez in the U.S. farmworker movement of the 1970s and is now a professor and author, has also articulated this concept of creative tension: "When we experience the "world as it is" in deep dissonance with values that define the "world as it should be," we experience emotional dissonance, a tension, only resolvable through action. Organizers call this agitation" (2010:535). In his organizing model, Ganz explains how successful social movements engage people at the level of values by shaping a public narrative that is in line with their vision. "Initiated in hopeful response to conditions adherents deem intolerable," Ganz says, "social movement participants make moral claims based on renewed personal identities, collective identities, and public action. In the United States, they have been the major drivers of social and political reform since the American Revolution" (ibid:527). Ganz reflects Damasio when he says that we "map the world affectively, coding experience, objects, and symbols as good for us or bad us for us, fearful or safe, hopeful or depressing, etc." (ibid:539) Narrative and storytelling – and by extension, values – are the ways in which we engage each other at this affective level.

In addition to this focus on values in determining vision, Ganz also brings to the discussion a focus on the role of hope in channeling tension into action. He notes psychological research indicating that "grievance leads to action only if combined with efficacy, or hope" (ibid:533). Without hope or the belief that action is worthwhile, tension leads to despair. He also discusses two sources of hope, one being the "experience of 'credible solutions" and the other rooted in faith traditions or spiritual, cultural or moral understandings (ibid:536). When defined at the level of outlook or worldview, this conception of hope can be seen as the inverse of fatalism as defined by grid-group cultural theory (Dake 1991).

6.3. Is creative tension consistent with the role of affect?

The previous section showed how this creative tension model of organizational or social change is supported in the experience-based literature, in which models are constructed based on methods that have been identified as effective in practice. But does this model fit within the theoretical framework outlined above? To return to neuroscience, research has shown that images referring to desired states activate the mesolimbic dopamine system in our brains, which is the system that responds to rewards or systems that evoke positive affect (Aarts et al 2007:166). As such, "positive affect plays a primary role in motivating goal-directed behavior" (ibid:166). This is not only true for images directly related to isolated goals that have been consciously decided upon. Damasio mentions that this effect carries over into images that are related to other images via categories in our brain maps (Damasio 2004:147).

"One of the main traits of civilized human behavior," Damasio writes, "is thinking in terms of the future" (2004:146). He continues, "Emotions and feelings have no crystal ball to see the future. Deployed in the right context, however they become harbingers of what may be good or bad in the near or distant future. The deployment of such anticipatory emotions/feelings can be partial or complete, overt or covert" (ibid:147). Behavior, then, is guided in part by positive anticipatory feelings regarding images of the future – on other words, vision.[17]

To return to the self-regulation function of emotions, the system itself operates in the context of a goal, which in the case of individuals is the above-neutral state of "wellness and

[17] It should be noted that anticipatory feelings are differentiated from *anticipated* feelings in that they are felt in the present (Lowenstein et al. 2001). As such, they are a *felt* part of our decision-making, rather than the detached object of rational calculation.

well-being" (Damasio 2004:35). In this way, it can be said that the homeostasis mechanism "inherently embodies values in the sense that it rejects certain conditions of operation, those that would lead to disease and death, and seeks conditions that lead to survival in optimal conditions" (Damasio 2005:48). Human values as we know them, Damasio posits, arose as an extension of our basic social emotions and as such, an extension of this life-regulation system (ibid:50). When we discuss an action being good or evil or otherwise embodying some sort of virtue, we are making a normative claim. Our capacity for normative judgment, as discussed earlier, is an extension of our ability to have emotions and feelings. At the level of society, this ability to discuss actions in terms of values or ethics allows us as a group to promote homeostasis and well-being (Damasio 2004:168). As such, engaging people at the level of values through narrative, as promoted by Ganz, is exactly what we should do to promote social change.

Ganz wrote that one of the sources of hope is the "experience of credible solutions" (2010:536). Although Damasio does not elaborate specifically on feelings of despair or hope, it is consistent with his model to argue that positive appraisals of credible solutions would be encoded in the body's maps, so that when considering such an action, the positive connotation of that image would impact the person's decision-making. Similarly, negative thoughts associated with an action, arising from experience or from analytical appraisals of its impossibility, would also impact the anticipatory feelings involved in decision-making.

To sum up, the idea of creative tension does seem to be compatible with a model grounded in the role of affect; the reason why creative tension has been shown to be effective at motivating behavior could have to do with the role of positive emotions relating to desired states.

7. Building a Model

Returning to the aim of producing a conceptual model of the mechanism driving mitigation behavior, this section will make an attempt at drafting such a model. The primary contribution of this model is intended to be the overall idea of creative tension, more so than the exact configuration of particulars variables. Below is a diagram illustrating how the elements might fit together.[18]

[18] This first attempt at articulating this mechanism was done according to my reading of the previous literature, and is one of many possible configurations. The delineation of specific terms for variables and the drafting of this particular configuration was done so as to allow sufficient precision for conducting fieldwork as well as to present a preliminary model that could be examined and refined through further research.

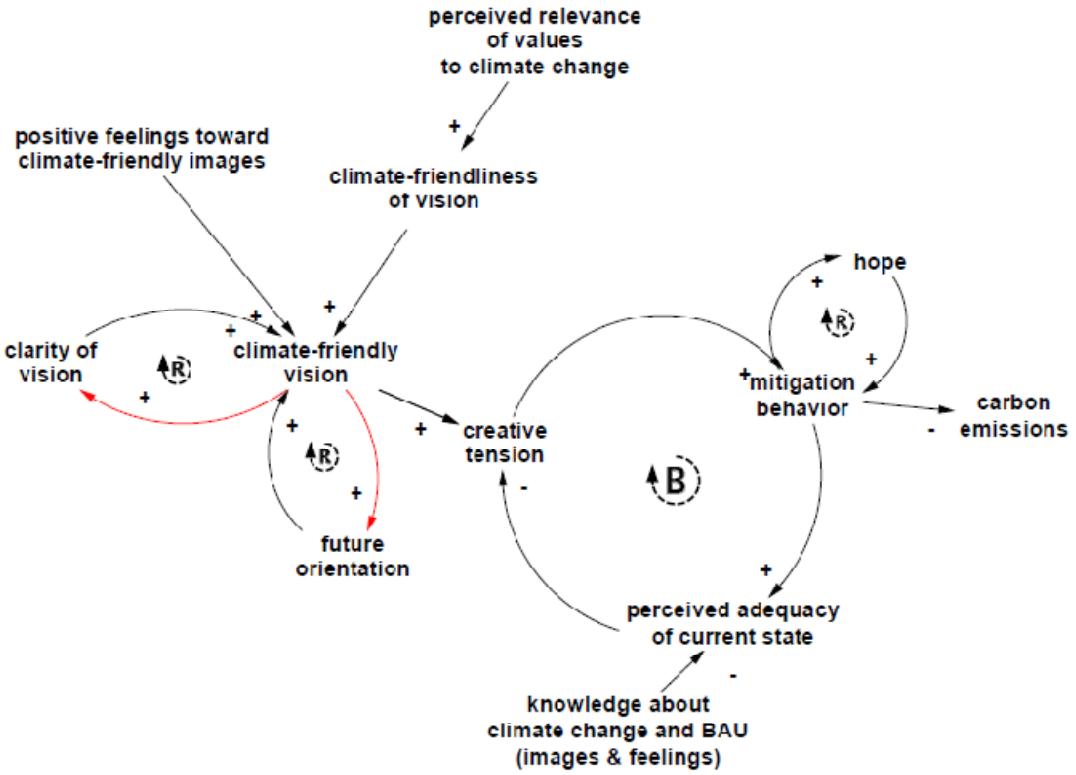


Figure 2: Causal-loop diagram of creative tension model of mitigation behavior. Based on author's review of the literature, this diagram shows a conceptual model of intentional individual-level mitigation behavior. Red arrows indicates possible relationships not directly supported or refuted by the literature.

The basic form of the CLD is the same as that of goal-seeking behavior mentioned above. Tension is created when there is a gap between the perceived adequacy of the current state and the vision, or desired state, which leads to action. In this diagram, the 'desired' and 'current' states are specified in terms of how they are perceived by the actor. 'Perceived adequacy of BAU' is the actor's appraisal of the current situation, specifically in terms of whether an extension of the current state (the business-as-usual path or BAU) is expected to result in the desired state. Although this term is broad, the assumed focus is the relevance of the current state in regards to the issue of climate change. This variable is affected by affectively salient knowledge about climate change and the projected BAU scenario.[19]

Because the focus of this project is mitigation behavior, the desired state is defined as a *climate-friendly* vision, the strength of which is affected by 'clarity of vision,' 'future orientation,' the 'climate-friendly images in vision, and the 'positive feelings toward climate-friendly images.' This terminology is admittedly awkward, but will be explained.

'Climate-friendliness of vision' affects the 'climate-friendly vision' in that it indicates the content. By 'climate-friendliness of vision,' I refer to the extent to which the content of peoples' visions contain solutions to climate change or constructive references to the issue. The modifier 'climate-friendly' is problematic, as it is difficult to say what exactly is climate-friendly or not.[20]

[19] An assumption underlying this connection is that 'knowledge about climate change' is credible, salient knowledge indicating that the BAU path is inadequate. When the current state reaches the desired state, this knowledge is obsolete.

[20] Appendix 3 contains a discussion of how this term was defined for the purpose of the empirical study.

But the basic idea of the term is the extent to which the images in peoples' visions contain positive, constructive images of what a low-carbon society could be like.

This vision content is determined by the actor's values, as with Ganz (2010). This item is also defined in terms of the actor's perception, based on the idea that what is important is the extent to which the actor sees his or her values as pertaining to the issue of climate change. As such, the claim that certain values are inherently more or less related to climate change is not being made. What matters in this case is whether the actor *sees* such a connection.

As noted above, images related to peoples' goals or desired outcomes affect decision-making based on their emotional content (Damasio 2004:54). 'Positive feelings toward climate-friendly images,' then, shape the vision. As 'climate-friendliness of vision' indicates content, 'positive feelings toward climate-friendly images' indicates the degree of positive affect people have toward images that are climate-friendly.

Because the subject of this model is mitigation behavior, such behavior leads to a reduction in carbon emissions in the model. Surely not all attempted action proves to be successful, but for the sake of clarity, the diagram assumes such a result.

Continuing to the additional components in the diagram, I have used the term 'hope' to indicate the actor's belief that action is worthwhile. The psychological literature includes a variety of concepts related to this idea, including internal locus of control, perceived behavioral control and personal efficacy (Ajzen 2002). For the sake of simplicity, I chose to operationalize this general idea as being the opposite of fatalism (as defined by grid-group cultural theory) (Dake 1991; Lima & Castro 2005). In terms of the system, a lack of hope will decrease the amount of action undertaken, regardless of whether tension is present. There is a connection from action back to hope because successful action is likely to increase the belief that action is worthwhile, as per Ganz's discussion on the power of 'credible solutions' (2010:536). This creates a reinforcing loop.

The last two components of the diagram are clarity of vision and future orientation. These factors are related to the strength of the vision, but are not particular only to mitigation-related behavior. 'Clarity of vision' is rather straightforward, and indicates the extent to which the actor has articulated a concrete vision. 'Future orientation' is a more general concept and refers to the extent to which a person tends to think about the future. This concept was not explicitly identified in the literature, but is implicit in the way both literatures talk about 'vision' as something with a comparatively long-term scope. This component was tentatively included in the model based on the assumption that different people tend to be more or less inclined to think in these longer time-scales.

PART TWO: Two Stages of Fieldwork

8. Exploring the model – a citizen study[21]

To examine the accuracy and usefulness of the creative tension model in explaining mitigation behavior, I conducted a qualitative study with a small group of U.S. citizens. Specifically, I examined whether a) the various components of the model individually were related to mitigation behavior, b) the evidence supports or contradicts the interaction of components as described in the model and c) the model seemed in general to be a useful tool to enhance understanding. A broader aim of this study was to explore whether positive emotions are indeed part of the mechanism behind creative tension.

The variables examined in the study largely reflect the components of the creative tension model outlined above, with a few minor changes made for methodological reasons. Specifically, participants' feelings toward climate-friendly images in general were separated from the feelings they had toward images from their own vision. In the model outlined above, the former was already separate and the latter was implicit in 'climate-friendly vision.'

[21] As will be explained, this research is exploratory and not representative of the larger population of American citizens. But to distinguish this first phase of fieldwork from the 'practitioner' phase later in the report, it will be referred to as the 'citizen study.'

8.1. Methodology and Methods

Damasio's epistemology is that of indirect realism, in that our minds' images of the world are "as real as anything can be" but are not direct facsimiles of the real world (1999:321). As mentioned earlier, this investigation aims to stay as consistent as possible with this realist spirit. Due to the exploratory nature of this study and out of practical necessity, however, a variety of methods were used in this study. Further research employing a variety of methods would be necessary in order to empirically test the proposed model. However, any investigation must recognize the inherently normative nature of such aspects of analysis as distinguishing between images that are 'climate-friendly' and those that are not.

The study used a comparative design as defined by Bryman (2004:13,56) and the methods of interviews and questionnaires. A combined method was chosen so that data gleaned from the interviews could be used in the questionnaires. Within these methods, word association and affective image analysis were used to address the questions regarding feelings, while additional questions in the interviews and questionnaires addressed other variables relevant to the creative tension model.

8.1.1. Participants

The sample[22] of participants was narrowed to people from one country so as to allow a certain degree of cultural homogeneity. The U.S. was chosen in particular out of convenience and so that the word association portion of the study could be conducted in peoples' native language without the needs for translation. The sampling method chosen for selecting participants was the snowball method, which was done until the point of theoretical saturation (Bryman 2004:301).[23] Initial respondents were selected from my extended personal network, with the aim of finding an informal diversity of views, backgrounds, ages and patterns of behavior. Participants then referred people they knew. Although diversity was sought, measures to ensure representativeness of the U.S. population were not taken due to the exploratory nature and limited scope of the study. Ultimately, the sample showed even gender distribution, but skewed toward being younger and more educated (see Appendix 1).

8.1.2. Interviews and questionnaires

The interviews were semi-structured and preceded the questionnaire for each participant. An interview guide was used, which included an introduction to the research and five basic questions (see Appendix 2). The main functions of the interview were to a) have participants describe their ideal vision of 2050 in an open-ended format, b) have participants describe their values, and c) gain an impression of the clarity of their future vision, the amount of climate imagery in their vision and their general future orientation.[24] Interviews were recorded, with the participants' consent, and were conducted via telephone, online voice chat, or online message chat according to the participant's preference.

Questionnaires were designed using the Google Forms online platform[25] and were filled out independently by the participants within several days following the interviews. Questionnaires were designed in batches, with four different versions in total, and between three and six people sharing one questionnaire. The questionnaires were identical across

[22] 'Sample' here refers only the a group and not a statistical sample of a larger population.

[23] In this case, 'theoretical saturation' was identified to be the point at which the group was large enough to contain a variety of levels of mitigation behavior, but small enough so as to be able to be studied intensively.

[24] Participants were also asked whether they felt their vision was shared by others and whether they think we will reach that vision if we stay on the path we are on, but this information was not systematically used during analysis.

[25] See http://docs.google.com/forms for information about this tool. As of August 2010, one version of this questionnaire can be found at http://spreadsheets.google.com/viewform?formkey=dEFiZHh4aXdGX1UzSWZvbEdMSWh2RlE6MA

versions, except for questions that included data gleaned from the interviews. Responses that required additional scoring or rating were analyzed together so as to allow for adequate comparison of responses. See Appendix 3 for a full list of variables and measurement methods used.

8.1.3. Affective imagery

The affective imagery components of this project were adapted from previous studies regarding climate change risk perceptions and other topics (Leiserowitz 2006; Benthin et al. 1995). As with these prior studies, Slovic's definition of affective images was used. He includes "sights, sounds, smells, ideas, and words, to which positive and negative affect or feeling states have become attached through learning and experience" (Slovic 1998:3, as quoted in Leiserowitz 2006:48). In affective image analysis, a structured form of word association is used to identify the positive or negative feeling associations that people have to certain prompts (ibid:48). As pointed out by Leiserowitz, this type of question is more open than multiple-choice questionnaire questions, is less likely to be influenced by researcher bias, and is considered an effective method for accessing and assessing subjective meaning (ibid:48). In previous studies, participants were given a prompt, such as 'global warming,' and were asked to list the first images or words that came to mind. They then indicated the degree of positive or negative feelings they had associated with those images, scaled from strongly negative to strongly positive. I directly adopted this method to gauge participants' feelings toward images associated with 'climate change' and 'carbon neutral city.'

To measure affect toward images in peoples' future visions, participants were first asked to describe these visions in open-ended questions during the interview. People were asked to describe their ideal vision of what the world should be like in 2050 (see interview guide in Appendix 2). I encouraged them to focus on aspects that were important to them, and to describe how they thought life would be different from today.[26] Some people gave more concrete images than others, so for the sake of being inclusive of different communication styles, I included concepts such as 'independence from fossil fuels' and 'fewer wars' as images.

In the questionnaire, people were asked to rate their feelings toward images that were gleaned from the interviews. The scale used was numeric between 0 and 10, in which 0 was described as the most negative feeling possible, and 10 as the most positive. As mentioned above, the questionnaires were designed in batches. This was done so that people would be asked to rate images besides only their own, based on the idea that people might more accurately rate their own images if they were included on a list with other images that they had different feelings toward.

To arrive at a score for 'positive feelings toward climate-friendly images in future vision,' I identified images in each questionnaire that seemed to fit within the definition of 'climate-friendly.'[27] For each person, scores from each image from their vision that fit into the category of 'climate-friendly' were averaged together to get the score for the general affective salience of the climate-friendly images in their future vision. Because I was looking only at positive feelings, I examined the data set to see whether anybody had an average negative affective salience toward their climate-friendly images. Since they did not, I left the data unchanged and relabeled it 'positive feelings toward climate-friendly images in vision.'

[26] People who focused on vague ideas or concepts (such as 'a sustainable civilization' or 'cleaner ways to live lives') were prompted with follow-up questions toward clearer imagery. A common follow-up question I used for this purpose was: "If you were magically transported to this version of the world as you just described it, and looked around, what would be the signs that [a sustainable civilization] was being realized?"

[27] As mentioned before, this is a difficult conceptual distinction. The main criteria I used for images categorized as 'climate-friendly' was that they had to do with solutions or means of climate change mitigation, broadly interpreted. These were positive images of how a low-carbon society might function. For more detail on how these images were selected, see Appendix 3.

Several variables were measured relating to 'climate-friendly vision,' and I spent a considerable amount of effort trying to figure out the best way to combine them into a single indicator. The method ultimately decided upon was to multiply 'climate-friendliness of vision' with 'positive feelings toward climate images in future vision,' based on the rationale that these two variables are a function of each other.

Peoples' ratings for all climate-friendly images in their questionnaire (both theirs and others') were averaged, resulting in score for 'affective salience of climate-friendly images.' Differing terminology was used in naming this variable so as to avoid confusion with the previous variable. I examined the data set and converted to zero the value for the one person who had an average negative affective salience toward the climate-friendly images. The resulting data set was called 'positive feelings toward climate-friendly images.'

8.1.4. Behavior

Participants were asked to indicate how often they engaged in various behaviors out of a concern for climate change. The questionnaire included a range of behaviors of different types that required various degrees of effort. For the purpose of analysis, the behaviors were put into four categories: 'life choices,' 'civic participation,' 'emissions reduction,' and 'smarter consumption' (see Appendix 3 for an explanation of this categorization). For the purpose of analysis, 'smarter consumption' was considered separately from the other behavior measures. One reason for this separation was theoretical; it could be argued that 'smarter consumption' behaviors are, by definition, more personal and less directed toward changing systems. The methodological reason for this separation is that in the results, the smarter consumption behaviors followed a different pattern than the other behaviors, so considering them separately allowed for more accurate analysis. A more detailed discussion of this difference will take place in the results.

8.1.5. Values

At the end of the interview, participants were asked to list the values or principles they tried to live their lives by. As with the images, these values were compiled and used in constructing the questionnaire. In the questionnaire, participants were asked, "In your opinion, are the following values related to the issue of climate change?" They could indicate whether they thought each value was 'unrelated,' 'not very related,' 'somewhat related' or 'strongly related.' Also as with the images, participants rated not only their own values but those of several other participants as well. In analysis, this scale was converted to a 0-3 range and scores from each participant's values were averaged to get the single 'values' score.

8.1.6. Knowledge

Two aspects of peoples' knowledge were explored – their knowledge of the problem of climate change and their knowledge of effective mitigation behaviors. Knowledge of the problem of climate change was gauged using two questionnaire questions. One question borrowed from a previous study (Leiserowitz et al. 2007) asked participants how convinced they were "that human activities are a significant cause of changes to the Earth's climate and long-term weather patterns." Options ranged from 'not convinced at all' to 'totally convinced.' The other question, borrowed from the same study, asked participants to select the 'primary cause' of climate change from a list of nine options. Answers from these two questions were combined into a single score.[28]

On the questionnaire, people were asked in an open-ended question, "If someone wanted to do something to help stop climate change, what do you think they should do?" This

[28] It could be argued that these factors should remain as separate variables, but since this investigation focused on knowledge that was salient to the individual, they were combined. For example, a person who correctly indicates 'burning fossil fuels' as the cause of climate change, but says he is only 'somewhat' convinced that human activities are a significant cause of climate change can be said to have less salient knowledge of the problem.

question preceded the specific questions about behaviors, so that people would answer according to their prior knowledge. I rated peoples' answers on a scale between 'poor' and 'very good,' which became the indicator for 'knowledge of effective mitigation behaviors.'

8.1.7. Perceived adequacy of BAU regarding climate change

This variable was measured using a composite of several questions asking about the extent of changes that would be necessary in peoples' lives to adequately address climate change, whether climate change should be dealt with immediately even at significant cost, and whether they thought that various entities (national government, business and industry, etc) were currently doing enough to address the issue. These questions were selected as a reasonable approximation of peoples' appraisal of the adequacy of the current state.

8.1.8. Other variables

As an inverse analogue to 'hope' as indicated in the creative tension model above, the questionnaire included questions to gauge participants' level of fatalism. These questions were adopted from an existing fatalism index used by Leiserowitz et al. in previous research (2007). 'Clarity of vision,' 'climate-friendliness of vision' and 'future orientation' were rated by me directly following the interviews and were based on an overall impression of how people had answered my questions. This interpretivist method was chosen out of necessity, as no other reasonable ways of measuring these variables were available. 'Climate-friendliness of vision' could potentially be measured according to the number of climate-friendly images in a person's vision, but during the course of the research I found this to be an inadequate indicator, mostly due to the wide possible scope of 'climate-friendly.' For example, some people discussed images such as community gardens or alternative fuels in contexts other than that of climate change and others talked passionately about a smaller number of climate-friendly images. An interviewer-rated indicator of 'climate-friendliness' allowed for these differences to be accounted for in the data.

8.2. Data and Analysis

Due to the number of variables measured in the study, many aspects of the model could potentially be analyzed. Because they offer the most unique contribution to the existing literature, variables related to vision were examined most closely during this study. Some other variables, such as knowledge, already have a significant body of research connected to them, while others, such as the role of hope, should be subject for further study. Corresponding to this investigation's focus on cognition, the specific content of participants' visions and values were not analyzed for their particular content. Rather, they were explored in regards to their instrumental value as connected to behavior. The data sets gathered in the study were found to be non-normal, so this analysis focuses on methods of comparison that do not include statistical correlation.[29]

8.2.1. Main findings

The results of this exploratory fieldwork did support the relevance of creative tension and the role of affect in explaining mitigation behavior. Specifically, this fieldwork demonstrated the relevance of the components of the creative tension model outlined above. Perception of values as related to climate change, positive feelings toward climate-friendly images and a climate-friendly vision were shown to be most predictive of mitigation behavior. Further research will be needed, however, to determine whether the arrangement of components within the model is accurate. Specifically, the data do not support the conclusion that values determine the content of vision directly. The model also can be said to be a useful explanatory tool, although further research and refinement of it is required. Regarding the broader aim of this study, the connection between affect and creative tension is also supported, based on the

[29] For the remainder of this report, terms such as 'related,' 'predict' and 'correspond' are used in the informal sense and do not refer to statistical correlation.

observation that people who showed the most positive feelings toward climate-friendly images in their visions also tended to show the other elements of creative tension and higher levels of mitigation behavior.

8.2.2. Overview of data

An overview of the data is contained in the table on the following page. For a comprehensive table of results, see Appendix 4.

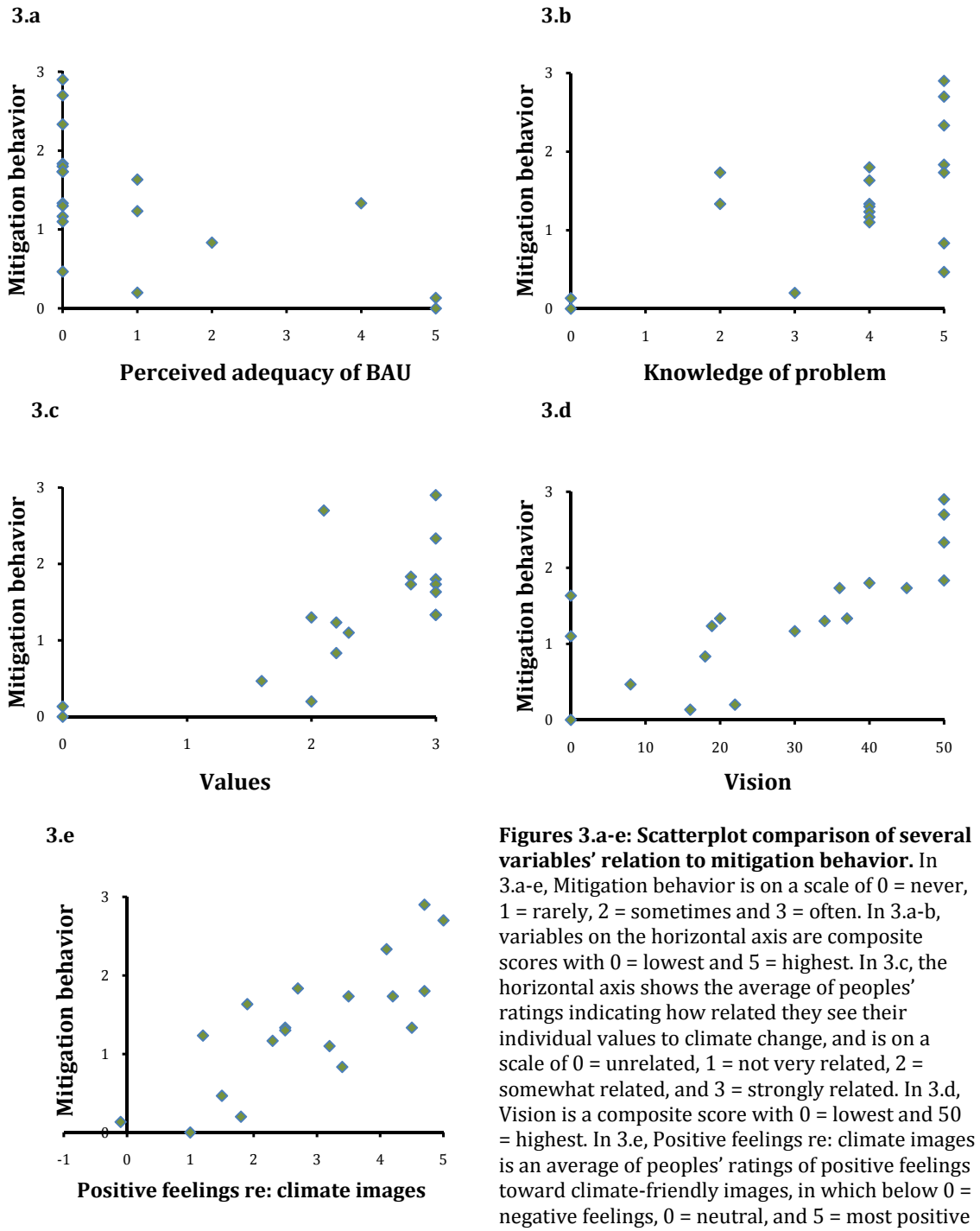
Participant	Future orientation	Values related to cc?	Perceived adequacy of BAU re: cc	Knowledge of problem	Knowledge of effective behaviors	Life choices	Civic engagement	Emissions reduction behavior	Mitigation behavior (avg. of previous 3)	Behavior categorization	Smarter consumption	Clarity of vision	Climate-friendliness	Affect of climate Images in vision	Vision	Feelings re: climate-friendly images	Fatalism
S	5	3	very low	totally convinced + burning ff	very good	3	2.9	2.8	2.9	very high	2.6	5	5	10	50	9.7	1.8
A	5	2.1	very low	totally convinced + burning ff	very good	2.3	3	2.8	2.7	very high	3	5	5	10	50	10	1
R	5	3	very low	totally convinced + burning ff	very good	2	2.7	2.3	2.3	very high	3	5	5	10	50	9.1	1.5
K	5	2.8	very low	totally convinced + burning ff	good/ fair	1.7	2	1.8	1.8	high	2.2	5	5	10	50	7.7	1.7
H	5	3	very low	totally convinced + don't know	good	1.7	1.6	2.1	1.8	high	2.4	5	4	10	40	9.7	1.5
L	4	2.8	very low	somewhat convinced + ozone	fair	1.3	2.4	1.5	1.7	above average	2.6	5	5	9	45	8.5	1.5
E	4	3	very low	totally convinced + burning ff	very good	1.3	2.4	1.5	1.7	above average	2.4	3	4	9	36	9.2	1.7
O	3-4	3	low	totally convinced + population	fair	1.7	1.7	1.5	1.6	above average	2.4	3.5	1	n/a	0	6.9	1.2
Q	5	3	very low	totally convinced + population	fair	0.3	1.7	2	1.3	average	2.8	5	4	9.2	37	9.5	2
C	0	3	don't know	somewhat convinced + don't know	poor	1.7	0.9	1.4	1.3	average	2.4	1	2	10	20	7.5	2.5
I	3	2	very low	totally convinced + ozone	fair	0.7	2.4	0.8	1.3	average	1.8	3	4	8.5	34	7.5	2.5
G	5	2.2	low	totally convinced + population	fair	1	1.6	1.1	1.2	below average	2.2	5	3	6.3	18.9	6.2	1.5
B	5	n/a	very low	totally convinced + ozone	very good	0.7	2	0.8	1.2	below average	2	4	3	10	30	7.3	1.7
J	5	2.3	very low	totally convinced + don't know	very good	0.7	1.1	1.5	1.1	below average	2	5	1	0	0	8.2	1.5
D	5	2.2	medium	totally convinced + burning ff	fair	0.3	0.9	1.3	0.8	low	2.8	5	2	9	18	8.4	1
F	4-5	1.6	very low	totally convinced + burning ff	good	0.3	0.7	0.4	0.5	low	1.8	4	1	8	8	6.5	1
M	2	2	low	somewhat convinced + burning ff	good	0	0.2	0.4	0.2	very low	1.8	3	3	7.3	22	6.8	2.3
P	3	0	too high	not convinced	n/a[1]	0	0.4	0	0.1	very low	0	3	2	8	16	4.9	1.5
N	2-3	0	too high	not convinced	n/a[2]	0	0	0	0	none	0	2	0	n/a	0	6	1

Table 1: Overview of data, citizen study. Summary of main study variables, ranked according to level of mitigation behavior. Data is color-coded according to the extent the value is or is not favorable to an increase in mitigation behavior, according to the creative tension model, whereas white is neutral, dark green is very favorable, orange is very unfavorable, and shades of light green and orange are somewhat favorable or unfavorable, respectively. The 'behavior categorization' column is not shaded because it was not a direct measurement. Abbreviations used in the table are: ff = fossil fuels, cc = climate change, BAU = business as usual, n/a = not applicable, avg = average, re = regarding.

[1] Full reply: Humans cannot change the climate

[2] Full reply: Humans are not the cause of climatic variation

Below is a figure comparing mitigation behavior with several variables assessed by the study. It shows that values, vision, and to a lesser extent, positive feelings are more related to mitigation behavior than the variables of 'perceived adequacy of BAU' and 'knowledge of problem.'



Figures 3.a-e: Scatterplot comparison of several variables' relation to mitigation behavior. In 3.a-e, Mitigation behavior is on a scale of 0 = never, 1 = rarely, 2 = sometimes and 3 = often. In 3.a-b, variables on the horizontal axis are composite scores with 0 = lowest and 5 = highest. In 3.c, the horizontal axis shows the average of peoples' ratings indicating how related they see their individual values to climate change, and is on a scale of 0 = unrelated, 1 = not very related, 2 = somewhat related, and 3 = strongly related. In 3.d, Vision is a composite score with 0 = lowest and 50 = highest. In 3.e, Positive feelings re: climate images is an average of peoples' ratings of positive feelings toward climate-friendly images, in which below 0 = negative feelings, 0 = neutral, and 5 = most positive feeling.

8.2.3. Perceived adequacy of BAU regarding climate change

As can be seen in the scatterplot in Figure 3.a, 'perceived adequacy of BAU' showed little relationship to mitigation behavior. Most participants (12 of 19) thought the adequacy of the BAU path was 'very low,' but among this group people showed a wide range of levels of

mitigation behavior. That being said, nearly all (7 of 8) people who showed above-average levels of mitigation behavior showed 'very low' levels of perceived adequacy of BAU, while the remaining person indicated that she thought the adequacy of BAU was 'low.' This could indicate that the perception of the BAU path as inadequate is a prerequisite for high levels of mitigation behavior, but by no means a guarantee of it. Consistent with the creative tension model, this would indicate that this factor must be present along with others in order to have an effect on behavior.

8.2.4. Knowledge

Being 'totally convinced' that climatic changes were due to human activity was a poor predictor of behavior: 14 of the 19 participants reported being totally convinced, five of whom had only low or average levels of mitigation behavior. The two people who reported being unconvinced that climatic changes were due to human activity reported nonexistent and very low levels of mitigation behavior, as could be expected. Of the remaining 17 people who reported being either 'somewhat' or 'totally' convinced, however, six showed below-average levels of mitigation behavior.

Knowledge about the primary cause of climate change or about effective mitigation behaviors were also comparatively poor predictors. Of the eight people who correctly answered that fossil fuels were the primary cause of climate change, three had low or very low levels of mitigation behavior. Of the 10 people who showed good or very good knowledge of effective mitigation behaviors, only six reported participating in mitigation behaviors above the average level.

8.2.5. Values

The data seems to show a connection between values and behavior, as predicted by the creative tension model. 15 out of 18 people rated their values as being 'somewhat' or 'strongly' related to the issue of climate change. One person did not answer the question regarding values. Of the seven people who rated their values as 'strongly' related to climate change, five had above average levels of mitigation behavior, while two had average levels.

One finding about values contradicted the interaction of the components in the model. In the model, peoples' values determined the content of the vision, in this case the climate-friendliness of it. In my research, 'perceived relevance of values to climate change' was not strongly predictive of 'climate-friendliness of vision.' Six of the nine people with average or below average 'climate-friendliness' rated their values as at least 'somewhat' related to climate change. It is possible that people who saw climate change through a values frame acted on it, even though it didn't particularly shape the priorities in their vision. It is also possible that the connection exists, but was not adequately measured using this methodology. Further research would be necessary to explore this set of variables.

8.2.6. Vision

The indicator of 'climate-friendly vision,' which was a composite of 'climate friendliness of vision' and 'positive feelings toward climate-friendly images in vision' did seem quite predictive of mitigation behavior. For the sake of brevity, this indicator will be referred to as 'vision.'

Only one out of the eight people who reported below-average levels of mitigation behavior had an above average 'vision' score. Of the eight people with above-average levels of mitigation behavior, seven had above-average 'vision' scores. And of the nine people who had climate-related and affectively salient visions that were at least somewhat clear, seven had above-average levels of mitigation behavior, and the remaining two reported average levels.

8.2.7. Positive feelings toward climate images

This indicator gauged the feelings people had toward all climate-friendly images mentioned by people in their batch. Every person in the study, except for one, reported some degree of positive feelings toward these climate images, on average. The remaining person

reported neutral feelings. There did seem to be a general trend in which higher positive feeling toward climate images in general corresponded with higher levels of mitigation behavior, as ca be seen in Figure 3.e., although this had a wide range in the sense that people with similar degrees of positive feelings toward climate-friendly images reported a variety of levels of mitigation behavior. This correspondence was greater when comparing positive feelings towar climate-friendly images with 'smarter consumption' behaviors, although the level of engagement in these behaviors for nearly everyone was relatively high.

8.2.8. Types of behavior

The group showed a variety of levels of engagement in the four types of behavior examined. As can be seen in Figure 4, the pattern of the frequency of behavior was similar for 'life choices,' 'civic engagement,' and 'emissions reduction,' with a somewhat even distribution of frequency. With 'smarter consumption' behaviors, however, the frequency was much less distributed.

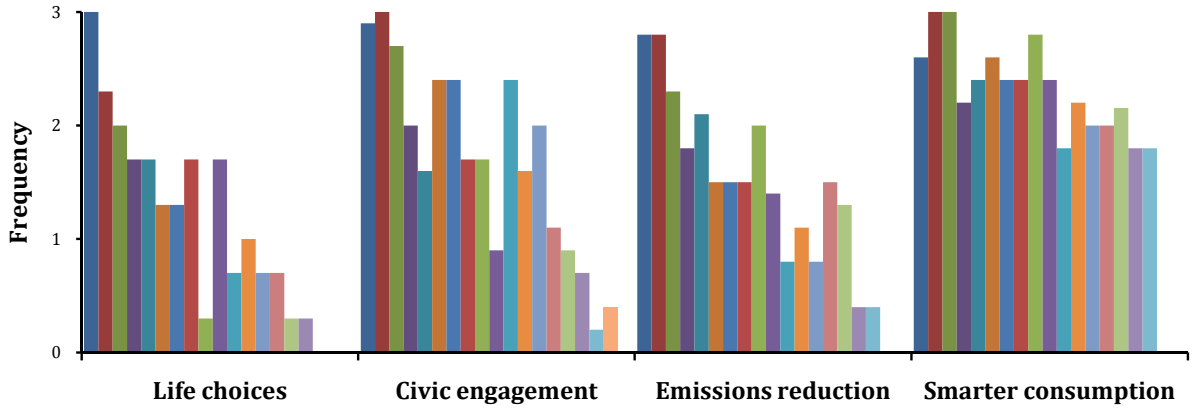


Figure 4: Comparison of frequency of mitigation behavior, sorted by type. Each column color corresponds to a participant. Participants are sorted according to their level of mitigation behavior (average of first three types). Scale for Frequency is 0 = never, 1 = rarely, 2 = sometimes and 3 = often.

Aside from the two people who were unconvinced about climate change, every person in the study reported engaging in smarter consumption behaviors at least 'rarely,' and 14 of the 17 people reported engaging in these behaviors at least 'sometimes.' This frequency is in stark contrast with the other categories of behavior; only 12 of the 17 people reported engaging in the second most-frequented activity, civic participation, at least 'rarely,' and eight people did these behaviors at least 'sometimes.'

8.2.9. Other observations

During the course of this study, I made several observations that did not fit within the above categories. One was that a considerable number of people (3 of 17 who were at least 'somewhat' convinced) thought the cause of climate change was the hole in the ozone layer, which is consistent with previous studies (Moser 2007:32).

The affective imagery component of the study that examined peoples' feelings toward images they associated with 'climate change' and 'carbon neutral city' proved problematic, as it seemed that some people had misunderstood the task.[30] Some people did not list images as such in their questionnaire response, but rather abstract and complex thoughts in the form of

[30] On reflection, it likely would have been better to do the word association portion of the study with people during the interview, which would have allowed for a chance to clarify the task and potentially prompt better quality answers from participants.

sentences, which complicated the feeling scoring of these images. As such, these indicators were not examined in-depth in the analysis. Because these items were additional to the model being explored, this exclusion was not consequential for the aims of the study.

During the course of the research, I also got the general impression that a focus on emotions is indeed appropriate for examining mitigation behavior and can be helpful in understanding individuals' decision-making regarding mitigation action. Respondent C, for example, was noticeably distressed about the future, and described herself as a "head-in-the-sand person" who gets easily scared about a range of possible dangers, such as terrorism, crime and climate change. However, she reported a significant amount of concern for climate change and a desire to overcome her fear and more proactively engage on the issue. On the survey, this person reported a low level of knowledge about the issue and about effective behaviors and during the interview, she talked extensively about recycling as a solution. This is of course speculative, but from talking with her, I got the impression that if she was able to get past her fear long enough to gain some kind of positive vision of how climate change could be overcome, along with a sense of hope, she might be able to channel her negative feelings into more proactive action. Conversely, many of the people who rated the highest on the scale of mitigation behavior discussed the importance of having a strong vision of the future.

8.3. Discussion of study

8.3.1. Limitations of study

Although no major threats to the validity of this study were identified, several limitations can be discussed. Inconclusive in this research is the role of hope or fatalism in promoting or preventing behavior. On reflection, using fatalism as an inverse indicator for hope is questionable, because all participants reported relatively low levels of fatalism, but my impression from the interviews was that they had different levels of 'hopefulness.' Using an indicator for fatalism that gauged general or background levels of such attitudes, rather than attitudes specifically pertaining to the issue of climate change action, was also potentially problematic.

In this research, I was limited in my ability to separate feelings, in the consciously-felt sense of the term Damasio outlined, and affect, which as mentioned above can be either conscious or not. Self-reporting of feelings is an imprecise measure, and further research exploring these connections should consider using methods of measuring affect as well. Another potential limitation was that 2050 is a relatively long time in the future. It is possible that research asking participants to share visions about a time not so far in the future might garner different results.

An aspect of my methodology that may have inadvertently reduced the validity of the data gathered was the practice of dividing people into batches for the sake of writing the questionnaire. It was not ideal that people received differing quantities of images and values to rate. Another clear drawback of the research is that it included a relatively small sample of people, and resulted in a non-normal distribution of data. Although this small sample was necessary due to the limited and exploratory nature of the study, a larger sample with a better data distribution would have been useful for being able to more concretely examine correlations between variables.

As noted in the literature (Damasio 1994; Williamson 2006), self-reporting of emotional response is not a precise or ideal measure, because our knowledge of our own emotional response is limited to what we can feel and because self-reporting allows for inadvertent or purposeful deception by participants. Due to the limited exploratory nature of this study, these limitations associated with questionnaires were deemed acceptable, but further research could explore this model using more precise measurement of emotional response.

8.3.2. Further research

As mentioned above, further research should examine and refine how the components in the model fit together, particularly how values affect mitigation behavior. Further study could

also seek to more accurately measure the degree of negative feelings people have toward climate change as it relates to mitigation behavior, particularly as compared with the relation between positive feelings via the vision and mitigation behavior.

The basic mechanism of the model could be explored in contexts different than that of climate change mitigation. Further research could also explore these variables in the context of group decision-making or action, as much of the mitigation behaviors that require higher levels of involvement are inherently group activities. Such research could build upon recent studies of group decision-making related to climate change (Hansen et al 2004; Milch et al 2009)

In the course of data analysis, I also wondered whether I should have talked with people more explicitly about the concept of creative tension, or at least tried to gauge more directly the level of 'tension' they felt about the issue. This is certainly difficult to measure directly, and no existing research I found contains a method to measure such a variable. More in-depth and open-ended interviews with people could be done to explore this concept more thoroughly.

9. From Model to Strategy

Despite the limitations and remaining questions discussed above, the study did offer general validation of the idea of creative tension as relevant for explaining mitigation behavior. This report will now turn to the question of how to best translate this conceptual knowledge into information that is useful for understanding situations and planning strategy for promoting action on climate change. In layman's terms, the basic idea of an approach stemming from this model would be to convince people that solutions to climate change are worth working toward, and that a low-carbon society is not only possible, but desirable. In more technical terms, such strategy could engage people at various points in the creative tension mechanism. This section will explore these various 'points of entry' and how organizations are using them to promote mitigation action, along with associated benefits and risks. The discussion will begin with elements that have been previously discussed, but most of the data from this section was gathered both via published strategy documents and interviews with practitioners. For more information about the methodology used for this research, see Appendix 5.

9.1. Perceived adequacy of BAU regarding climate change

As mentioned previously, information campaigns seek to increase knowledge about climate change and the undesirability of the BAU path. While a perception of the inadequacy of the current situation is necessary for creative tension, it alone is not sufficient for meaningful mitigation action, according to the creative tension model. In addition to information campaigns, efforts that seek to increase negative feelings toward projected BAU scenarios are also operating within this element of the model. Actions that originate only from feelings of fear or dread, however, are of a different sort and would be illustrated with a different model. Most interviewees confirmed this view of this variable, and none refuted it.

9.2. Positive feelings toward climate-friendly images

Futerra, a sustainability communications company based in the United Kingdom, argues that climate change is now a "salesman's problem," and because "selling hell" by focusing on "Armageddon climate scenarios" has shown to be ineffective, people should instead try to "make heaven sizzle" (Futerra 2010:2). They advise to "describe a desirable and descriptive mental picture of a low carbon future," which captures the imagination and taps into those starved and withered emotions: hope, a sense of progress and excitement about tomorrow" (ibid). The vision also wins "the right to hold people's attention long enough to get to the call for action" (ibid). Their strategy document, "Sell the Sizzle," outlines how craft such a pitch – make it visual, local or national, desirable and free of boring dates and figures. They point out how "compelling visions of 'better' have inspired us to overcome massive odds before" (ibid:10). After selling people on the vision, the guide advises, you should juxtapose the vision with the (more hellish) alternative and frame action as a choice between the two futures. After this, steps should be taken regarding the specifics of planning and acting.

Referring back to the model, Futerra's strategy promotes 'positive feelings toward climate-friendly images' and aims to create tension via the juxtaposition with the BAU scenario. Futerra's strategy comes close to the creative tension model, but intentionally avoids the value aspect of climate action, saying that talking with people about values makes people "angry, and justifiably so" (ibid:2). At the end of the strategy guide, they say that the message is "adaptable" to whatever reasons the messenger has. This alludes to the inherently instrumental role of strategies based on communications. The reason to sell people on positive images of the future is that it's effective at changing behavior, not due to any more fundamental understanding of why we should engage people as willful actors. So while Futerra's guide helpfully outlines ways in which to effectively paint pictures of heaven, this should not be mistaken for an honest, thoughtful strategy for promoting willful action.

Other types of strategies aim to increase positive feelings toward low-carbon images by more hands-on methods than traditional communications. Transition towns, computer simulation games, museum exhibits and other art installations aim to get people excited about climate change solutions by allowing people to experience them first-hand[31]. As with Futerra, this type of engagement can be a useful part of a larger strategy, but alone is not adequate for inspiring action.

A program coordinator for SustainUS, a youth-run organization working on issues related to climate change, also pointed out the need to make images of the future accessible to people (L. Nutter 2010, interview). Goals such as 'green jobs,' '80% by 2050' or 'carbon neutrality' can be confusing to people not familiar with climate change, she said. She also mentioned that attempts to promote tangible images should be put into terms that people understand and have personal relevance to them, such as how climate change will affect their community.

9.3. Connections between values and climate change

Strategists at the World Wildlife Fund have engaged in a public dispute with Futerra regarding proper strategy for promoting mitigation action. In their own strategy document, they criticize 'marketing' approaches as disingenuous and make an argument for engaging people in a discussion of values (Crompton 2008). They provide evidence from several fields showing the connection between values and action, and make the moral argument that because climate change is a moral issue, it should be treated as one at the societal level. They then go on to argue that a specific set of pro-environmental values should be promoted, ones that value nature for its own sake and shift away from materialism. This focus on climate change in terms of values is in accordance with the creative tension model, but trying to promote particular values is a questionable strategy. As mentioned earlier, climate change mitigation also potentially includes anthropocentric values.

9.4. Increasing hope

Several interviewees mentioned how vision is important, but it is necessary to also show people how people like them have been able to successfully act in regards to climate change. This aim echoes Ganz's 'experience of credible solutions.' This strategy, a representative of the Energy Action Coalition said, can help convince people who already buy into the vision and understand that things should change that action is personally worthwhile and 'doable' for them (W. Jones 2010, interview). The danger in relying only on this element of the strategy, as other interviewees pointed out, is that it can minimize the urgency of action, if not also coupled with a clear vision and a belief that the current situation is inadequate. So while this factor is important to promoting action, it cannot stand alone.

9.5. A more comprehensive approach

Many of the representatives from youth organizations I talked with showed a basic understanding of the importance of these elements of the creative tension model, although none

[31] See http://www.transitiontowns.org and http://www.urgentevoke.com for examples

specifically used those terms. Several people pointed out the ineffectiveness of information-based and scare-tactic approaches and the importance of engaging people positively at an emotional or meaningful level.

The Our Climate, Ourselves program operated by the Sustainability Institute outlines a strategy that incorporates many elements of the creative tension model as outlined above. In a document published on their website (Sustainability Institute 2006), they describe their two goals as promoting education regarding the systems aspects of the problem of climate change and a positive future vision. They argue that people need to understand the nature of feedbacks, tipping points, and other systems-related properties of the climate system to get a sense of urgency on the issue and that vision is important as motivation for action. OCO does not specifically make reference to the tension created by the juxtaposition of these two elements, which is similar to the creative tension model, but it is implicit in their strategy. As opposed to selling people on particular climate-friendly images, OCO recommends promoting discussion among people regarding what they personally would want to see happen in a low-carbon future. The self-directedness of the visioning process recommended by OCO is arguably more in line with an understanding of the role of affect. With this strategy, genuine dialogue and goal-setting replaces communications or the selling of particular images.

9.6. Other strategies

Other possible strategies for engaging people using this model might focus on encouraging 'clarity of vision' and 'future orientation' more generally in society by providing platforms for discussion about future plans and visions, and to encourage long-term planning in governments, businesses, and other institutions. Such strategies are not specific to climate change mitigation, but may indirectly promote it due to encouraging people to engage at the level of vision.

10. Discussion and Conclusion

Reflecting upon the data gathered during these two stages of fieldwork, it seems that there is indeed merit in the idea of using creative tension to promote mitigation behavior. As mentioned at the start of this paper, people in various positions are interested in promoting mitigation behavior. The value of a study such as this could therefore be evaluated according to a range of discourses and paradigms – too many to discuss fully in this report. This section will cover several main practical and theoretical points and identify areas for further research.

10.1. Practical discussion

Discussions of behavior change, particularly those including values and visions, are politically tricky. Visions can be seen as dangerous utopias, and 'behavior change' can carry with it Orwellian overtones (Handelman 2009; Kelman 1990). But it could be argued that such social taboos have emerged as a means of protecting the status quo and deterring social change. If this is the case, and if the premise is accepted that a 'social revolution' is actually what is needed to mitigate climate change, then these norms could justifiably be confronted.

This project sought to identify methods of promoting mitigation behavior that are not only effective but also theoretically supported. In other words, to explain not only *what* should be done, but *why*. As this project progressed, I realized that while the creative tension model developed here and existing marketing-based approaches share some similarities in form, the explanatory difference that separates them is significant and further supports the merit of such an aim. Specifically, strategies such as Futerra's, that incorporate vision and knowledge, have answered the question of *what* to do, but for the question of *why*, their only answer is *because it works*. The same limitation can be found in activists' strategies that employ essentially the same tension-based model. This justification might satisfy some practitioners, but other parties might demand more. The creative tension model outlined above, along with its underlying affect-based justification, can additionally offer the reason *because it is the right thing to do*. Conversely, risk aversion-based strategies mentioned earlier in this paper can offer a

comprehensive theoretical justification, but run into moral problems trying to apply the theory to strategies.

10.2. Theoretical discussion

As mentioned above, the idea of creative tension as such has not yet been examined in the behavioral science literature. One could inquire as to why, given that the concept has been prominent in the organizational change literature for quite some time and that it is directly relevant to decision-making and behavior. Although this is speculative, it could be argued that mainstream psychology's focus on pathology rather than factors behind healthy behavior has predisposed the behavioral sciences in general to focus on aspects such as barriers to change. Discussions of 'positive visions of the future' and 'positive emotions' could carry pop-psychology or self-help connotations that have prevented serious study of these factors. That being said, research has been done on isolated elements of the creative tension model, such as the role of goals in behavior[32]. Further research could more thoroughly examine the existing literature to identify similar concepts or themes and better situate creative tension within that context.

Extending from this same line of reasoning, it could be argued that conceptual models such as this, that provide justification for engaging people at the level of intentional decision-making, could bring an element of humanism back to the behavioral sciences. In the effort to isolate variables and be precise in measurement, conscious judgment and willful action have largely been overshadowed by environmental and neurophysiological factors behind behavior. As explained above, such research leads to design- or engineering-based behavior change strategies that 'tinker' with environmental or other prompts and do not engage people consciously in the process of change. Models such as the creative tension one discussed here might encourage more whole-person strategies for change. While arguments could be made as to whether such strategies are more or less effective, they are certainly more democratic.

10.3. Further research

In addition to the further research mentioned above, additional areas for study more broadly related to the aim of this project can be identified. This project investigated the role of positive feelings related to visions of the future. A similar project could explore the role of negative feelings associated with unmet goals in the context of climate change – essentially the flip side of creative tension. This study or the present one should also be more comprehensively compared and integrated into existing research regarding models of behavior change and decision-making from the behavioral and social sciences.

This study provided only a brief examination of current strategies for promoting change; additional research could explore these strategies and their effectiveness more in-depth, possibly using a comparative case study method. Such research could also examine the applicability of this model to group decision-making processes.

This research also indicated that 'smarter consumption' behaviors showed a different pattern than other behaviors, which could indicate that they are functionally different in respect to motivations for behavior. Further research could examine these differences and determine whether they indicate any substantive or functional distinctions.

10.4 Conclusion

This project set out to understand and explain mitigation behavior, and to provide a contribution of theoretical and practical value. In the first part of this project, a conceptual model was developed based on the role of affect and creative tension, offering a contribution to the behavioral science literature. The fieldwork conducted in the second part of this project indicated that the idea of creative tension – that a positive vision of the future, when coupled the sentiment that the business-as-usual path won't get us there and a sense of hope that change is

[32] See Senay et al. 2010 and Valentin 2007 for examples of strands of this research

possible – can be a powerful motivation for action and warrants further study. Specifically, the role of values and vision in promoting behavior should be examined.

As mentioned in the introduction, there will be no 'silver bullet' for climate change mitigation. At most, this project is a small and exploratory part of a much larger discussion about how to meet the challenges posed by climate change. That being said, this research does support a potentially promising and inspirational idea – that science may indeed be "combined with the best of a humanist tradition," as Damasio hoped, not only to "lead to human flourishing" but to confront one of the biggest threats of our time. That we might be able to come together and build that bright green future we see on the horizon.

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Appendix 1: Citizen Study Demographic Profile of Participants

Age	Number of Participants
Under 25	6
25-39	8
40-54	4
55 and over	1

Gender	Number of Participants
Male	9
Female	10

Education	Number of Participants
Some high school	0
High school diploma (incl. GED)	2
Assoc. degree or 2-year program	1
Bachelor's degree	8
Some graduate school	3
Graduate or professional degree	5

Appendix 2: Citizen Study Interview Guide
When approached for an interview, people were told that the study was on "people's thoughts about the future and climate change." The following is a basic script that I followed when conducting the interviews:

Mind if I record this conversation? This is just for my own purposes. What you say will be confidential.

There are **two parts** to this research – this interview and the survey afterward. In the survey I'll have a few questions about climate change, but that's a separate thing. In this interview, I'm looking to get your general thoughts on the future and what you value.

I'm going to ask some pretty **big-picture** kinds of questions, things that different people spend more or less time thinking about. That's fine – take your time and just share whatever thoughts you do have.

Now, when I bring up the topic of **the future – is that something** you've spent much time thinking about**?**

Okay, so we're going to do a small **visioning exercise**. I'd like you to close your eyes and try to picture what you think the world should be like in 2050, which is 40 years from now. This is based on what you think is important, your ideal vision. It can be as similar or different from today's world as you want. You can think of this in terms of your own life, your community, your country, or globally. **Take a second, and then tell me a bit about what that scene is like – what would you see?**

- Probing (if necessary) – What would people do? What will life be like? How would people live their lives?
    - Imagine that you were magically transported into that world, your ideal vision of 2050. When you look around, what are the signs that things are different?

Do you think this vision is **shared** by other people?

Thinking about this vision of the future in 2050 and the world as it is now, do you think we're **on track** to getting to that vision of the future or do you think more significant changes would need to be made to get us on that path? Why or why not?

What would you say are your core **values** or the principles you try to live by?
Survey – contact via email again with follow-up questions?

Appendix 3: Citizen Study Variables and Measurement

This appendix provides further information regarding the variables examined in this portion of the fieldwork and how they were measured. This list is organized alphabetically by variable.[33]

Behavior

Questions regarding behavior were posed as: "Have you ever done any of the following things because you were concerned about climate change?" Participants could select between 'never,' 'rarely,' 'sometimes,' 'often,' and 'yes, but for another reason.' The list of behaviors was drafted with the help of two friends familiar with climate issues. The main purpose was to be inclusive of a variety of behaviors that people might engage in out of concern for climate change, regardless of how effective these actions are at reducing emissions or changing systems.

The behaviors fit into four categories, which were designated during the analysis stage. Items were interspersed on the survey and not listed by category. The categorization was made based on the type of behavior as well as the degree of investment or effort required by the action. Because the categorization was done after the list of behaviors had been set, I chose to group behaviors based on how well I saw them fitting together as a group, rather than into pre-existing behavior categories made by a theorist. 'Life choices' were actions that required the most investment on the part of the participants and had to do with ongoing lifestyle decisions. 'Civic engagement' behaviors had a political or civic participation aspect and mostly required a medium level of effort. The line between 'reducing own emissions' and 'smarter consumption' is not as defined as the previous two categories, because they both have to do with behaviors related to consumption and resource use. The distinction I made between them had to do with whether the action had more to do with reducing one's consumption or with making existing consumption more efficient or streamlined, whereas the former was categorized as 'reducing own emissions' and the latter was 'smarter consumption.' Behaviors in the 'reducing own emissions' category were ones that indicated a change from mainstream means of meeting needs to alternative, lower-carbon ones. 'Smarter consumption' also had to do with consumption, but included behaviors that did not require a substantive change in the *amount* of consumption done by a person. Below is a list of the categories along with the behaviors that fit within them:

> Life choices: Joined, donated money to, or volunteered with an organization related to the issue; Chose a certain type of education or career; Chose a certain kind of housing or place to live
>
> Civic engagement: Made a certain voting decision; Signed a petition; Participated in a protest or demonstration; Attended a community event related to local solutions for climate change; Tried to learn more about the issue; Supported legislation to reduce carbon emissions; Talked to family, friends or colleagues about ways to reduce your climate impact
>
> Reducing own emissions: Participated in gardening or other food cultivation; Chose to avoid eating meat; Chose not to fly (or chose an alternative); Made an effort to live more simply; Chose not to drive (or chose an alternative form of transport); Chose a certain kind of vacation, or chose not to travel; Chose certain kinds of hobbies or leisure activities; Made an effort to buy less 'stuff'
>
> Smarter consumption: Participated in recycling; Made energy efficiency improvements to your home; Used energy-efficiency as a guideline when buying a light bulb, a household appliance, or a vehicle; Chose food with less environmental impact; Made an effort to buy 'local'

[33] As of August 2010, one version of the online questionnaire can be found at http://spreadsheets.google.com/viewform?formkey=dEFiZHh4aXdGX1UzSWZvbEdMSWh2RlE6MA

Clarity of vision

This variable was a rating done by myself following each participant interview, and was done based on my general impression of how specific or clear the participant's vision was. Rating was done on a scale between 0 and 5, where 0 was the least clear and 5 was the most.

Climate-friendliness of vision

This variable was a rating done by myself following each participant interview, and was done based on my general impression of how climate-friendly, or related to climate, each person's vision was. Rating was done on a scale between 0 and 5, where 0 was the least clear and 5 was the most.

Climate-friendly images

To select which images should fit in the category of 'climate-friendly,' I made an initial selection based on the following criteria. Images in this category were related in some way to how a low-carbon society might function, and included technological and behavioral aspects. Focus was put on images that are commonly associated with reducing carbon emissions, such as renewable energy. Images referring to social or political themes, such as 'no homelessness' or 'cooperation between nations' were not included in this category, although the argument could be made that to be sustainable, these social aspects of society should be attended to. But for the sake of not deeming nearly every positive image as 'climate-friendly,' and to focus on the theme of climate change mitigation, images that more directly referred to social or other themes were not included. An exception to this is when the image was discussed by the participant in the context of sustainability, as was the case for 'community-based problem solving' and 'civic participation.' Additionally, care was taken to include the original wording used by the participants, which resulted in some repetition. After I made an initial categorization, the division was then discussed with two people familiar with climate change – one LUMES classmate and one person working in the nonprofit field. They both confirmed my initial selection. The list of images categorized as climate-friendly is below:

> Wind turbines, walkable cities, local agriculture, reduced meat consumption, fewer cars, community-based problem solving, local food production, community gardens, fuel-efficient cars, public transportation, renewable energy, CO_2 reduction, electric cars, recycling, alternative fuels, no fossil fuels, local food systems, consumer-driven transition to alternative fuels, civic participation, less-is-more mentality, safer and cleaner ways to live lives, stopping the growth of CO_2, less consumption, safe rapid transit, less urban sprawl, reduced greenhouse gas pollution, independence from fossil fuels, and consolidation of cities.

Feelings

The variables of 'positive feelings toward climate-friendly images,' 'feelings toward climate change' and 'feelings toward carbon-neutral city' were assessed using affective imagery analysis, which is explained in detail in Section 8.1.3.

Future orientation

The variable of 'future orientation' was a rating done by myself following each participant interview, and was done based on my general impression of oriented the person was toward the future, specifically concerning their answer to the question, "Do you spend much time thinking about the future?" A low score would be given if the person expressed anxiety about talking about the future or expressed a preference for thinking in terms of the present or past, as was the case with Respondent C. A high score was given when the person clearly indicated that they spend considerable time and energy on future planning, especially if they related their future vision to actions they currently engaged in. Rating was done on a scale between 0 and 5, where 0 was the least clear and 5 was the most.

Hope/Fatalism

The 'hope' variable was considered to be the inverse of 'fatalism.' The questionnaire included questions to gauge participants' level of fatalism, which were adopted from an existing fatalism index (Leiserowitz 2006). Participants were asked, "To what extent do you agree or disagree with the following statements?" and could rank the following statements on a five point scale between 'strongly disagree' and 'strongly agree.'

The future is too uncertain for a person to make serious plans.
It doesn't make much difference if people elect one or another political candidate, for nothing will change.
I feel that life is like a lottery.
A person is better off if he or she doesn't trust anyone.
I have very little control over my life.
It's no use worrying about public affairs; I can't do anything about them anyway.

Participants' responses to these six items were averaged to produce a composite 'fatalism' score.

Knowledge

Two questions were used to assess knowledge of the problem of climate change. The first asked, "How convinced are you that human activities are a significant cause of changes to the Earth's climate and long-term weather patterns?" Participants could select between 'totally convinced,' 'somewhat convinced,' 'not very convinced,' and 'not convinced at all.' The second question asked, "What do you think is the primary cause of climate change?" Participants could select one of the following items: damage to the ozone layer, burning fossil fuels, deforestation, population growth, nuclear power plants, toxic wastes, cows, use of aerosol spray cans, rice fields, or 'I don't know.' 'Burning of fossil fuels' was considered the most correct answer.

As mentioned in this report, participants were asked the open-ended question, "If someone wanted to do something to help stop climate change, what do you think they should do?" I rated peoples' answers on a scale of 'poor,' 'fair,' 'good' and 'very good.'

Perceived adequacy of BAU regarding climate change

This variable was measured using a composite of several questions. The first asked, "To properly address the issue of climate change, how much change do you think people in the U.S. need to make in how they live their lives?" Participants could select between 'no change at all,' 'a few minor changes,' 'some change,' 'a significant amount of change,' and 'no change at all.'

The second question asked, "Which of the following statements most closely reflects your own opinion?" Participants could select one of the following:

- Global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs.
- The problem of global warming should be addressed, but its effects will be gradual, so we can deal with the problem gradually by taking steps that are low in cost.
- Until we are sure that global warming is really a problem, we should not take any steps that would have economic costs.
- I don't know.

This question could also be said to be an indicator of participants' knowledge of the problem of climate change, but the decision was made to include it as an indicator of 'perceived adequacy of BAU' because it addresses how participants view the kind of change that is necessary.

The final question within this variable asked, "In your opinion, are each of the following currently doing too much, the right amount, or not enough to fight climate change?" Participants could select 'doing too much,' 'doing the right amount,' 'not doing enough,' or 'I don't know' for

each of the following items: the international community, the US government, your state government, your local government, your fellow citizens, and corporations and industry.

Based on participants' answers to the above three questions, I ranked them on a scale of 'very low,' 'low,' 'medium,' 'high,' 'very high,' and 'too high,' where 'too high' indicated that the participant thought too much action was being taken in the name of climate change mitigation.

Values

Values gleaned from the interviews were compiled and listed on the questionnaire. Participants then ranked their individual values as being 'unrelated,' 'not very related,' 'somewhat related' or 'strongly related' to the issue of climate change. Each individual's ratings were then averaged. A full list of values can be found in Appendix 4.

Appendix 4: Citizen Study Complete Data

Abbreviations used in these tables are: ff = fossil fuels, cc = climate change, BAU = business as usual, n/a = not applicable, avg = average, re = regarding. The first table is color-coded according to the extent the value is or is not favorable to an increase in mitigation behavior, according to the creative tension model, whereas white is neutral, dark green is very favorable, orange is very unfavorable, and shades of light green and orange are somewhat favorable or unfavorable, respectively.

Participant	Future orientation	Values related to cc?	Perceived adequacy of BAU re: cc	Knowledge of problem	Knowledge of effective behaviors	Life choices	Civic engagement	Emissions reduction behavior	Mitigation behavior (avg. of previous 3)	Behavior categorization	Smarter consumption	Overall avg.	Clarity of vision	Climate-friendliness	Affect of climate Images in vision	Vision	# Climate images in vision	Feelings toward climate-friendly images	Feelings toward carbon neutral city	Fatalism	Feelings toward 'climate change'
S	5	15/5=3	very low	totally convinced + burning ff	very good	3	2.9	2.8	2.9	very high	2.6	2.8	5	5	10	50	2	87/9=9.7	17.5=3.4	1.8	9/5=1.8
A	5	15/7=2.1	very low	totally convinced + burning ff	very good	2.3	3	2.8	2.7	very high	3	2.8	5	5	10	50	5	120/12=10	20/5=4	1	0/5=0
R	5	12/4=3	very low	totally convinced + burning ff	very good	2	2.7	2.3	2.33	very high	3	2.5	5	5	10	50	2	82/9=9.1	20/5=4	1.5	0/5=0
K	5	11/4=2.8	very low	totally convinced + burning ff	good/ fair	1.7	2	1.8	1.83	high	2.2	1.9	5	5	10	50	1	46/6=7.7	17/5=3.4	1.7	10/5=2
H	5	9/3=3	very low	totally convinced + don't' know	good	1.7	1.6	2.1	1.8	high	2.4	2	5	4	10	40	2	58/6=9.7	16/5=3.2	1.5	7/5=1.4
L	4	22/8=2.8	very low	somewhat convinced + ozone	fair	1.3	2.4	1.5	1.73	above average	2.6	2	5	5	9	45	5	102/12=8.5	what?; 13/5=2.6	1.5	13/5=2.6
E	4	9/3=3	very low	totally convinced + burning ff	very good	1.3	2.4	1.5	1.73	above average	2.4	1.9	3	4	9	36	2	110/12=9.2	18/5=3.6	1.7	3/5=0.6
O	3-4	12/4=3	low	totally convinced + population	fair	1.7	1.7	1.5	1.63	above average	2.4	1.8	3.5	1	n/a	0	0	62/9=6.9	15/5=3	1.2	3/4=0.75
Q	5	3/1=3	very low	totally convinced + population	fair	0.3	1.7	2	1.33	average	2.8	1.7	5	4	9.2	37	4	76/8=9.5	20/5=4	2	12/5=2.4
C	0	6/2=3	don't know	somewhat convinced + don't know	poor	1.7	0.9	1.4	1.33	average	2.4	1.6	1	2	10	20	1	45/6=7.5	15/5=3	2.5	2/5=0.4
I	3	8/4=2	very low	totally convinced + ozone	fair	0.7	2.4	0.8	1.3	average	1.8	1.4	3	4	8.5	34	2	45/6=7.5	7/3=2.3	2.5	5/2=2.5
G	5	11/5=2.2	low	totally convinced + population	fair	1	1.6	1.1	1.23	below average	2.2	1.5	5	3	6.3	18.9	4	37/6=6.2	4/2=2	1.5	10/5=2
B	5	did not reply	very low	totally convinced + ozone	very good	0.7	2	0.8	1.17	below average	2	1.4	4	3	10	30	1	88/12=7.3	16/4=4	1.7	3/3=1
J	5	7/3=2.3	very low	totally convinced + don't know	very good	0.7	1.1	1.5	1.1	below average	2	1.3	5	1	0	0	0	41/5=8.2	11/4=2.8	1.5	3/4=0.8
D	5	11/5=2.2	medium	totally convinced + burning ff	fair	0.3	0.9	1.3	0.83	low	2.8	1.3	5	2	9	18	4	101/12=8.4	4/2=2	1	11/5=2.2
F	4-5	8/5=1.6	very low	totally convinced + burning ff	good	0.3	0.7	0.4	0.47	low	1.8	0.8	4	1	8	8	1	39/6=6.5	10/5=2	1	4/5=0.8
M	2	2/1=2	low	somewhat convinced + burning ff	good	0	0.2	0.4	0.2	very low	1.8	0.6	3	3	7.3	22	3	41/6=6.8	10/5=2	2.3	15/5=3
P	3	0	too high	not convinced	n/a[1]	0	0.4	0	0.13	very low	0	0.1	3	2	8	16	2	44/9=4.9	?	1.5	20/5=4
N	2-3	0	too high	not convinced	n/a[2]	0	0	0	0	none	0	0	2	0	n/a	0	0	36/6=6	?	1	9/3=3

Participant	Future Images	Values	Are we on track to reach your vision or are changes necessary?	Is your vision shared by others?
S	achievement of MDGs, major reduction in poverty, good quality of life (not amount of stuff), access to health services and education, equality of opportunity, meeting of sustainability goals - protections for living things, decreased GHG pollution, renewable energy, active role for civil society, US as one of those leading countries, pers want to help achieve those goals, have to travel to see these changes, cleaner air and water, stable climate	honesty, treating people equally, respect for life, having sense of obligation to contributing to making the world a better place, appreciating what others have done before me	this path will get us to some of them; not on path to all	yes, especially re: MDGs, but not re: all
A	wind turbines, walking, gardens, CO2 reduction, fewer cars, cooperation between nations, reduced military spending	empathy, compassion, respect, kindness, generosity, community, love	in some ways - especially in San Francisco, there are good signs, but broadly, lots of changes	totally, but people are so different
R	naturally renewable energy sources, completely independent of fossil fuels, cities not very different, technology advanced - ppl will be more autonomous, have flexibility to maximize time at home and at work, increased role of technology to get what we want, more focus on community and family instead of individual, end of organized religion and more focus on individual spirituality	accountability, integrity, looking outside of oneself, leveling the playing field	need changes; America needs to be plunged into more despair so people become more introspective; ppl have to start thinking about what's really important	parts yes, 40% of ppl yes, 40% no, 20 somewhere in between
K	easy travel, technology to have sust world, awareness and protection of env resources, peace, fewer war headlines, be aware of other people, not so arrogant, right to education, local food systems, givers not takers, think more about decisions	honesty, trustworthiness, giving back, happy and fulfilling life, family and friends	ppl are becoming aware re: natural resources, but still laregly on BAU path. changes necessary	yes, not majority but a shifting trend
H	access to education and healthcare, alternative fuel sources, no fossil fuels, care-based education, cooperation between nations, less sharp boundaries, teachers paid more, decreased military spending, more education and less entertainment on the news	cliché - golden rule, care, education, learning	changes necessary; not headed on right path	yes, by liberal ppl. others might also if they thought it was realistic
L	local food production, community gardens, renewable energy, no offshore drilling, solar and wind power, more green areas, water protected, less building, communities that are in touch with each other, co-op farming, less materialism, community-based problem solving	honesty, trustworthiness, dependability, family, golden rule, protect environment, less greedy, selflessness, community, faith in God	lots of major changes; some people trying	yes, but many might not think it's realistic
E	civilization that's sustainable, cooperation between countries, culture change, people make better consumer and voting decisions, culture of responsibility, conservation, decline of american power make ppl think about limits, no gas guzzlers, fuel efficient cars, less meat, not sure what	respect for people and world, doing 'good works', not leave things in worse shape than found them, try to right mistakes	sig change nec, not sure what that would be	sure, increasingly
O	better, less poverty, fewer wars, better leadership, better quality of life, no hungry kids, no homelessness, people not being scared to leave their homes, continue what's good about now - travel, education, etc.	respect others, respect all life on earth, respect earth and animals, be aware, don't take things for granted	yes and no, everyone wants better quality of life, but selfish	yes and no. not that drastic - doable
Q	better government regulation, less urban sprawl, consolidation of cities, more communication between nations, public transportation, less hostility, improved quality of food, better and cleaner energy sources, no war? only human, less meat consumption, independent farming, local food systems, improved farming practices	live life as fully as possible without getting in the way of others	we're getting on track; need more change in social attitues/culture,	um, yes - but it's not necessarily a real dream
C	recycling, danger-free travel, a world without war, very scared about future	(integrity), (justice), honesty, life	lots of changes	no, it's difficult. don't want to talk about it
I	corporations actively involved in communities, consumer-driven transition to alternative fuels, ppl living closer to and investing more time w/their families and enjoying natl resources, less poverty, improve lives and address conflict in developing world, stop growth in CO2, mitigate social and env causes of that - scary because don't think it's going to happen	kindness, being nice to people, being healthy in body and mind, making time for a good life	will take more knowledge and caring about issue; pessimistic; will take ppl demanding it from themselves and others; little faith in govt and np comm	think a lot of ppl think about it. Think people value same goals, but have different views on how to get there
G	develop the underdeveloped world, clean water, no exploitation, civic participation, safer and cleaner ways to live lives, give voice to marginalized and no new marginalized groups, less fighting, human security, true middle classes in countries, children living better, ppl living longer, equal access to healthcare, food, education, less consumption, support for diversity, debt-to-equity ratios, ppl empowered to affect marketplace, less is more mentality, ppl thoughtful about consequences of behavior,	centrist/christian values, civic participation, right to have an opinion, equality, right and responsibility to help make the world a better place, sentiment without action is irrelevant	changes; should and going vastly different	yes, at core people are not apathetic; hope is inherent in most people
B	renewable energy, a livable population, access to quality information, free flow of people around the world, renewable energy resources, protection of water resources	compassion, family	lots of changes; little confidence in BAU	some ppl share it
J	service work, volunteerism, access to healthcare and education regardless of anything, ppl vote for leaders, livable climate, ppl have compassion for ea other	goodwill, compassion, give ppl benefit of the doubt	forward steps being made; optimistic; BAU won't get us there	yes, a number of ppl, but also a number of ppl don't agree
D	community-based problem solving, sharing, community gardens, public transportation, time with family, free health clinics,	respect, life, religious beliefs, doing 'good works', community	undercurrent of ppl on right trajectory, but not in government	yes, certain ppl do
F	new energy sources, cures for diseases like hiv/aids, no hunger, ppl smiling, not rushing or worrying, positive news images, affordable ways to meet needs, equal and stigma-free access to ways to meet needs	don't make assumptions, respect, open about who you are, sensitive to others, golden rule, benefit of doubt, compassion	more changes - overhaul of something	um, yes, everyone's 'better' is different
M	alternative fuels, electric cars, public transportation, disease cures, flying cars, mobile computing, constant communication, people working out of vehicles and not offices	don't be evil, be nice to people	yes, we are on that path	probably. not too far-fetched
P	ppl getting along, no tyrants, access to food and shelter, alternative energy (renewable and plentiful), better world, tech we can't imagine, rapid and safe transit, explosion of knowledge, realization of truth,	as inspired word of god, ppl are flawed, love toward others, even enemies	ppl are flawed, greedy, don't know if vision is possibile	yes, probably
N	stopped moral decline, conservative judeo-christian, no hate crimes legislation protecting gays/lesbians, embracing traditional values, eradication of abortion, respect for traditional families, less government, less fighting about issues, undisturbed free market, ppl have money to help ppl	fall short of own judeo-christian values, god is one true god, fighting to keep traditional family, love	big changes - ball rolling in opp direction, moving toward socialism, but some ppl waking up. Will get worse before better	yes, but you don't hear about it too much

Appendix 5: Strategies Investigation Overview

The purpose of this part of the fieldwork was to explore strategies based on the creative tension model from a practitioner perspective. Specifically, the aims were to examine the usefulness of these strategies, to identify how components of this strategy are being used and to what degree of success. Strategies were examined via two methods – a review of published strategy documents of various organizations working to promote mitigation behavior and interviews with people from the same kind of organizations. I selected organizations that I had previously known were using these types of strategies as well as organizations that I had found during the course of my research using internet searches. The group is not meant to be a representative sample in any way. Documents were reviewed from the following organizations:

Futerra: http://www.futerra.co.uk/
Our Climate, Ourselves – The Sustainability Institute: http://www.ourclimateourselves.org/
World Wildlife Fund -
http://www.wwf.org.uk/what_we_do/campaigning/strategies_for_change/
Worldchanging – http://www.worldchanging.org/

Interviews were conducted when the organization to be examined did not have published strategy documents, which was particularly the case with the youth organizations. The interviews were qualitative and done using an interpretivist strategy (Bryman 2004).

Interviews were conducted with the following people:

Oleg Izyumenko, Co-Founder and Co-Director, Wake-Up Call
Whit Jones, Deputy Field Director, Energy Action Coalition
Bjarke Kronborg, President, Nature and Youth – Denmark
Lauren Nutter, Agents of Change Program Coordinator, SustainUS

Appendix 6. Strategies Investigation Interview Guide

Description of project: This project is about strategies for engaging people on the issue of climate change.

Do you mind if I record conversation?
How does your work involve getting people engaged on climate change?
What do you think is the best way to engage people on the issue?
Do you have opinions on what strategies are ineffective?
In my research, I'm looking specifically at the role that a positive vision of the future has in motivating people to act on climate change, the idea being that if people have an idea of how they would like the world to be in the future, they would be more motivated to act. Do you have any thoughts on that?
Have you heard of the phrase 'creative tension'? (It is the tension that arises when our experience of the current situation conflicts with our idea of how the world should be, which leads to action.) Do you think this applies to the context of climate change?
Is this a common strategy? What drawbacks do you think it has?
What motivates you to do your work?
Any other thoughts?
Can I quote you by name?