PSYCHOLOGICAL RESPONSES TO ENVIRONMENTAL MESSAGES:
THE ROLES OF ENVIRONMENTAL VALUES, MESSAGE ISSUE DISTANCE, MESSAGE EFFICACY
AND IDEALISTIC CONSTRUAL

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Abstract

As environmental problems have become global, so have communications about them. Many in the environmental movement are concerned that such seemingly insurmountable problems will lead to feelings of helplessness, and thus inaction. Response efficacy, the feeling that one can make a difference, has been studied within the context of health and risk for many years, and is central to a number of leading theories of persuasion and decision-making. This study seeks to examine the roles of these two message factors—distance and efficacy—in psychological responses to environmental communications. Environmental values have been theoretically linked to environmental behaviors, and empirical research has largely supported a causal model of environmental decision-making that starts with values. Construal level theory (CLT) has been used to explain how different frames (proximal versus distal) result in different mental representations on a number of dimensions. This study seeks to introduce construal level, specifically idealistic values versus pragmatic concerns, as a possible mechanism whereby environmental values manifest themselves in environmental attitudes and behavioral intentions. Idealistic construals are found to significantly mediate the values-attitude and values-intentions relationships, and distance and efficacy message factors are found to interact with values in determining idealistic construal. The mediating role of perceived efficacy, which has been established in prior research, is also measured and included in an overall model of environmental message effects. Concern that global issues engender lower perceived response efficacy appear to be unwarranted. Rather, issue distance may enhance efficaciousness. Implications and possibilities for future research are discussed.
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Introduction

“Green” is quickly becoming the dominant marketing heuristic of our time. Beyond corporate social responsibility, companies are now actively marketing to a new consumer segment—LOHAS (lifestyles of health and sustainability)—a fast-growing psychographic of an estimated 35 million Americans (mostly educated women) with annual disposable incomes totaling over $200 billion (Natural Marketing Institute, 2008). Green claims have become so widespread that the Federal Trade Commission has issued a set of guidelines to prevent abuses (http://www.ftc.gov/bcp/grnrule/guides980427.htm).

The impact of this trend is also evident in whole new classes of products and services, such as eco-tourism and carbon-offset vouchers. The direct pro-environmental benefits of these purchase behaviors are far from clear. Even a casual review of the media coverage of these environmental issues—they type of review one would assume an environmentally motivated consumer would undertake—reveals a high degree of controversy as to whether these products and behaviors are really doing any good. But millions of people are buying into the green marketing movement nonetheless.

At the core of this emerging market segment are environmental values. More and more people are buying products and services with green claims, not because they perceive the behavior as having a direct and efficacious positive impact on the environment but because they are aligning their purchase behaviors with their environmental values, with their identities. Recent findings in environmental psychology support the idea that for many behaviors, where
the actual environmental impact is difficult to identify or quantify, people are motivated by their general environmental values. For behaviors clearly linked to positive environmental outcomes, however, the role of values is less important (Stern, 2000).

The problem from an environmental communications standpoint, then, is to understand when values-based appeals will be more effective, and when efficacy-based appeals will be more effective, and why.

This research question directly relates to the concept of efficacy, or, more specifically, perceived response efficacy. That is, do people believe, with a high degree of certainty, that undertaking a prescribed pro-environmental behavior will result in the indicated pro-environmental outcome? For example, people who recycle clearly believe that by separating certain materials in their garbage they are helping to reduce the impact of landfills and decrease the amount of new materials and energy required to manufacture new packaging. Skeptics, on the other hand, may believe that landfills are no big deal and that recycling actually takes more energy and resources than simply using new raw materials in the production process. In this mindset, recycling is nothing more than a way for waste management companies to increase the cost of garbage removal and separate people from their money. There are certainly several other psychological, behavioral and situational reasons that someone would choose not to recycle (laziness, embarrassment, etc.). These behaviors may be at the core of the anti-recycling attitude just presented. But it is reasonable to assume that for many, if not most, people, perceived response efficacy is an essential element in environmental decision-making.
Another critical concept in environmental research and practice is spatial distance. Environmentalism emerged as a local issue, but has morphed into a discussion dominated by global threats. This transition represents a drastic shift in how environmental issues are conceived. Former Vice President Al Gore, the leading voice in the fight to prevent global warming, recounted the difficulties presented by the globalization of environmentalism in his 1992 book *Earth in the Balance*. “Despite mounting evidence that the problem was truly global, few people were willing to think about the comprehensive nature of the response needed...Most people still thought of the environment in local or regional terms, so it was impossible to get adequate funding” (Gore, 1992, p. 6). Although local issues are still the focus of many environmental messages, the collective action required to reduce global warming requires a different type of appeal. People are being asked to engage in pro-environmental behaviors to combat abstract threats. Conventional wisdom related to persuasive message design suggests the key is to make distant, abstract threats more immediate and concrete (Heath & Heath, 2007). While this is no doubt constructive advice, it does not make the global local, and does not in and of itself advance our understanding the differing psychological processes triggered by different types of issues.

The elemental nature of these two variables—distance and efficacy—in environmental communications is clearly indicated in one of the most ambitious and extensive advocacy advertising campaigns in the history of the environmental movement. Al Gore’s Alliance for Climate Protection recently launched a $300 million multimedia advertising blitz called the We Campaign. The goal of the effort is to enlist 10 million volunteers to pressure government to
enact policies to reduce greenhouse gas emissions. The campaign’s website, www.wecansolveit.org, displays its primary logo and slogan at the top of each page:

we can solve the climate crisis.

The role of efficacy in this message is clear. Indeed, efficacy is the message. Calls for individuals to become involved are secondary to the idea that their participation can and will make a difference. The distance factor is also clearly evident. The “w” in the word “we” is a custom typeface designed to look like an upside down “m.” The effect here is to visually state that “we” and “me” are two sides of the same coin, to equate the socially distant others inherent in the notion of “we” with the proximal self that constitutes “me.”

Communication science has looked closely at the concept of efficacy, and it is central to decision-making theories that have served as frameworks for studying message effects. Examination of message distance factors in a communication context, however, has been less extensive. Construal level theory provides a powerful framework in which to examine how people perceive and think about proximal and distal issues. More specifically, construal levels have been found alter mental representations in terms of idealistic values versus pragmatic concerns within the specific context of the environment. The more temporally distant an object, the more people are affected by values-based appeals (in this case, a values-based appeal was operationalized as emphasizing environmental friendliness) (Trope, Liberman, & Wakslak, 2007). The interaction between construal level and idealism (operationalized as environmental values) has been established, but has not been directly tested.
This study will examine the relationships among these three variables that are central to environmental communications: values, issue distance and response efficacy. Specifically, an experiment is conducted to explore how pre-existing environmental values will affect responses to environmental messages containing differing levels of issue distance (global versus local) and message efficacy (low versus high) in terms of attitudes and behavioral intentions.
Theories of environmental decision-making

The dynamics of persuasive environmental messages have been the subject of a steady stream of research over the past 40 years. This experiment will examine persuasion within the framework of communication science, an integrative approach that encompasses research from quantitative, empirical and behavioral methods (Baran & Davis, 2006). But it should be noted that this is only one way of looking at the issue of environmental persuasion. The study of rhetoric has been a fundamental feature of modern civilization. It was one of the seven original liberal arts and has been a basic subject of higher education for centuries (Benjamin, 1997). The rhetorical tradition has been directed toward the relationship of people to nature. Indeed, modern scholars coined the term “greenspeak” to describe the rhetorical analysis of environmental communications (Harre, Brockmeier, & Mulhousler, 1999). Numerous studies have taken this and other qualitative approaches to examine how people talk about nature, and to what effect. Though informative, the literature of primary relevance to this study is in the tradition of communication science.

Levels of analysis
Within this framework, there are two basic levels of analysis: individual and societal. At the individual level, theories of persuasion are constructed with the basic, psychological building blocks of human decision making. These theories are used to predict and explain how people will respond (or not) to persuasive messages. Process models of persuasion theorize further as to the mechanism by which persuasive messages achieve their desired effects of attitude change. Societal-level theories examine the role of communication in the formation and change
of groups. Integrative models bring together variables from multiple levels of analysis in an attempt to define broad classes of communication inputs and outcomes. It should be noted that the different levels of analysis are interrelated, rather than distinct. Psychological theories often include variables related to social norms, and societal-level theories may include measures of individual differences.

**Societal level theories of persuasion**

A number of societal-level theories of media effects have been employed to examine the persuasive effects of environmental messages: cultivation (Good, 2007; Holbert, Kwak, & Shah, 2003; Shanahan & McComas, 1997; Shanahan, Morgan, & Stenbjerre, 1997), third person effect (Jensen & Hurley, 2005), agenda setting (Ader, 1995; Kim, Scheufele, & Shanahan, 2002; Simon, 1997), framing (Davis, 1994, 1995; F. Y. Shen, 2004), situational theory of publics (Major, 1998; Roser & Thompson, 1995), image restoration theory (Deshpande & Hitchon, 2002), and social movement theory (Dardis, 2007).

Theories of environmental communication, however, should be situated in within the well-established disciplines of environmental psychology and sociology. Environmental attitudes are expressed at the level of the individual, but they are generated and shaped within a specific social context. This reality has led environmental sociologists and psychologists to expand models of environmental behavior and decision making to include social contextual variables that are considered critical to the development of individual environmental worldviews and attitudes (Oreg & Katz-Gerro, 2006; Stern, 2000).
Societal-level variables that have been studied as predictors of environmental concern include dominant religion (Schultz, Zelezny, & Dalrymple, 2000; Yuchtman-Yaar & Alkalay, 2007), level of environmental degradation (Gelissen, 2007; Inglehart, 1995; Tjernstrom & Tietenberg, 2008; Zahran, Kim, Chen, & Lubell, 2007), level of political openness (Tjernstrom & Tietenberg, 2008; Zahran, et al., 2007), GNP growth (Gelissen, 2007; Israel, 2004) and level of social harmony (Oreg & Katz-Gerro, 2006; Schwartz, 1992). The bulk of the literature, however, has focused on the relative impacts on environmental concern of wealth and postmaterialist values (Brechin, 1999; Brechin & Kempton, 1994, 1997; Diekmann & Franzen, 1999; Dunlap & Mertig, 1997; Franzen, 2003; Lee & Kidd, 1997).

Ronald Inglehart’s influential theory of materialist-postmaterialist values shift hypothesizes that system-level changes within cultures (specifically increased economic development, distinct cohort experiences, rising levels of education and expansion of the mass media) lead to individual-level increases in emphasis on needs for belonging, self esteem and self-realization (Inglehart, 1977, p. 5). Among the most salient and most studied of the postmaterialist values predicted by the theory is that of environmental concern. That is, as countries become more affluent, the proportion of citizens holding postmaterialist values will increase, and concern for protecting the environment will grow (Franzen, 2003).

This basic view—that on an individual level environmentalism flourishes predominantly among the wealthy and that on a national level it emerges mainly in wealthy, developed, Western societies—did not go unchallenged. Empirical evidence on global environmental attitudes, notably the Gallup International Institute Health of the Planet Survey in 1992, found
concern for the environment to be widely held across countries and relative income levels (Dunlap & Mertig, 1995). Postmaterialism, it seemed, was only a partial explanation for the emergence of environmentalism (Brechin & Kempton, 1994; Guha & Martinez-Alier, 1997). In response, theorists augmented the concept of a postmaterialist shift with the idea of objective environmental problems, arguing that citizens of poorer countries become more concerned about the environment because of their direct exposure to pollution and degradation (Franzen, 2003). Inglehart referred to these two sources of influence as “objective problems and subjective values” (OPSV) (Inglehart, 1995).

Guha and Martinez-Alier (1997, p. xxi) studied the evolution of environmental social movements in different cultures and referred to the OPSV dichotomy as the “empty belly” and “full-stomach” determinants of environmental concern. Empirical support has been found for both aspects of the OPSV explanation, but the evidence is far from consistent and researchers have argued for a more comprehensive approach (Franzen, 2003). In particular, it has been argued that a brighter light be shined on the social construction of environmental issues within cultures and, by extension, the role of the media (Buttel & Taylor, 1992).

Empirical research related to environmental sociology notwithstanding, within communications science the examination of societal-level theories of persuasion has been opportunistic rather than systematic. That is, the topic has often been used strategically rather than instrumentally. The one exception to this trend has been the application of cultivation theory to deal specifically with environmental issues (Good, 2007; Holbert et al., 2003). Opportunity exists for the development of a broad theory or model that describes how the
media affects the public on issues of the environment. The starting point for such a theory, however, is at the psychological level, and it is this level of analysis that is the primary focus of this study.

**Psychological level theories of persuasion**

At the individual level, the variables that have been most studied in relation to their impact on environmental concern are age, gender, education, income and sociopolitical orientation (Corbett, 2006). Birth cohort (age) and education have been found to be relatively strong and consistent predictors of environmental concern (Dietz, Stern, & Guagnano, 1998). Age is generally negatively related to environmental concern, as younger cohorts show more pro-environmental attitudes than older cohorts. Educational achievement generally relates to higher levels of environmentalism, reflecting the enlightenment hypothesis, whereby knowledge socializes the value of the common good. The role of gender has been less consistent in empirical findings, but overall women tend to report stronger environmental attitudes than men (Zelezny, Chua, & Aldrich, 2000). At the individual level, higher levels of income tend to be associated with higher levels of environmentalism (Fransson & Garling, 1999), although the precise relationship between wealth and environmental concern has been at the center of theoretical debate, and tends to vary cross-culturally. Political ideology has also been studied as a predictor of environmentalism, with conservatives demonstrating higher support for business and industry and lower support for preservation of nature (Fransson & Garling, 1999).
The identification of key variables that are correlated with environmental concern, however, does nothing to build predictive models. Toward this end, environmental researchers have built on theories of attitude and behavior change. The concept of the attitude has historically been described as an essential component, if not the central component, of social psychology (Allport, 1935). Frustration with weak empirical correlations between attitudes and behavior, however, led scholars to refined theories of persuasion (Hale, Householder, & Greene, 2003), most notably the theory of reasoned action (Fishbein & Ajzen, 1975, 1980). TRA posited that the strongest predictor of behavior is one’s behavioral intention, and that intentions are the result of individual (attitudinal) and social (normative) influences. The theory applied only to volitional behavior, as spontaneous or habitual behaviors may not elicit the conscious calculations that underpin the theory. Behaviors over which an individual has limited or no control are also outside the theory’s boundaries. This limitation was addressed by Ajzen’s Theory of Planned Behavior (1985), which added the variable of “perceived behavioral control,” a concept closely related to the idea self-efficacy (Bandura, 1982).

While TRA and TPB were developed as primitive decision-making models, which could apply to just about any topic or issue, other theories were directed more specifically at responses to communications, and fear appeals specifically. Protection Motivation Theory (Maddux & Rogers, 1983; Rogers, 1975) was designed to describe the cognitive processes underlying persuasive fear appeals. PMT includes the concept of response efficacy, as well as appraisals of threat vulnerability and severity. The Extended Parallel Process Model (Witte, 1992) sought to improve and expand on prior fear-appeal theories by providing more specific propositions as to why fear appeals fail.
The Elaboration Likelihood model (Petty & Cacioppo, 1986) and the Heuristic Systematic Model (Chaiken, Libermann, & Eagly, 1989), which are known together as the dual-process models, address the mechanisms by which some messages lead to more significant and lasting attitude change in some people. Though extremely useful in analyzing media effects, these models can be conceived as more directed toward message structure than message content, and are often employed in conjunction with a more elaborate communications theory. For example, PMT has been used to identify when certain fear appeals are more effective with a certain group, using a dual-process to hypothesize how and why (Meijnders, Midden, & Wilke, 2001).

In terms of environmental communication, another important strain of theory has a genesis in the norm activation model of behavior (Schwartz, 1970, 1977). This approach has sought to introduce higher-level variables, such as general beliefs or values, into the decision-making equation. From this point of view, TRA and TPB need to be augmented because they do not link specific environmental attitudes to worldviews or values (Stern, Dietz, & Guagnano, 1995). These models include broader concepts of beliefs (beyond specific attitudes toward specific behaviors), as well as broader classes of environmental behavior (beyond specific behavioral intentions) (Kaiser & Gutscher, 2003; Kaiser, Hubner, & Bogner, 2005; Stern, 2000).

Each of these approaches has theoretical strengths and weaknesses, many of which have been examined in depth (Eagly & Chaiken, 1993). The following discussion focuses on findings in the specific area of environmental communications, which has been dominated by social psychological research based on TPB.
The application of persuasion theory to environmental issues has been accumulative. As the limits of one theory or framework become evident, the theory is modified or augmented to improve its explanatory power. In terms of individual-level communication science, an early example of this was the addition of identity as a variable in TPB. Sparks and Shepherd (1992) measured attitudes, subjective norms, perceived behavioral control and self identity as a “green” consumer and their effects on behavioral intention to consume organic vegetables. Their findings contradicted the idea that self identity would have no direct effect on behavioral intention (and operate instead through attitude toward the behavior). This research reflected findings from other topical areas, and suggested that for some issues the beliefs and values considered antecedent to attitude toward the behavior within the TPB model may actually have a direct effect on behavioral intentions and behavior.

Reflecting an important public issue of 1990s, several studies examined attitudes and behaviors related to recycling. In general, findings supported the notion that in terms of environmental issues, values play an important role. Cheung, Chan and Wong (1999) found a direct effect of general environmental knowledge on behavior in a study examining wastepaper-recycling among college students in Hong Kong. In addition, this study found that the perceived difficulty of the behavior mediated the intention-behavior link, and that perceived behavioral control had no effect on behavior. The authors argued that the findings indicate perceived behavioral control may be a multi-dimensional construct. Other studies, on the other hand, supported the idea that attitudes and intentions mediate the relationships between abstract environmental values and behavior (McCarty & Shrum, 1993, 1994).
The increasing empirical evidence in the area of environmental attitudes and behavior, and the inconsistent findings, led some to suggest TPB, or some modification of it, should serve as an organizing framework for the field (Berger, 1993). Within the specific area of “waste management” (recycling and composting), Taylor and Todd (1995) noted the need for an integrated model of the relationships between environmental beliefs, attitudes and behavior. This “integrated waste management model” added to TPB the concepts of perceived innovation characteristics, facilitating conditions and self-efficacy. This model, as well as an intermediate environmental belief-behavior model (in which all the same variables have a direct, unmediated effect on behavior) and the traditional TPB model were compared (Taylor & Todd, 1997). Results indicated a good fit for the environmental belief-behavior model and the integrated waste management model, but not TPB. The analysis suggested that people engage in pro-environmental behavior based largely on personal, altruistic values, defined primarily in terms of social benefit.

Interest in the impact of general environmental values on behavior also led to model building based on specific existing theory in social psychology. Stern et al. (1995) developed a framework linking specific environmental attitudes, as addressed by TPB, and broader worldviews and values, as reflected in Schwartz’s norm-activation model (1970). This “model of environmental concern” posited a hierarchical relationship from social structures and constraints, to values, to general beliefs, to specific beliefs and attitudes, to behavioral intentions, to behavior. This model was later expanded in the values-beliefs-norms (VBN) theory of environmentalism (Stern, 2000), a causal chain of five variables leading to behavior: personal altruistic values, ecological worldview, awareness of adverse consequence, ascription
of responsibility to self, and personal norms for pro-environmental action. VBN also divides behaviors into four classifications: activism, non-activist public sphere behaviors, private-sphere behaviors and behaviors in organizations. The authors assert “strong initial support for the VBN theory’s contentions that personal moral norms are the main basis for individuals’ general predispositions to pro-environmental action” (p. 413).

This model exemplifies a total transformation of existing TPB approaches to satisfy the unique requirements of environmental issues. But not all researchers have abandoned TPB so completely. Some studies have combined norm-activation and TPB in a much more straightforward fashion (Harland, Staats, & Wilke, 1999); results once again confirmed that personal norms had a significant direct effect on behavioral intentions. Another recent study, however (Bamberg, 2003), argued that the assumption that general attitudes like environmental concern can directly affect specific behaviors is misguided. This study found values were an indirect determinant of intentions, operating, as TPB predicts, through attitude toward the behavior. In a direct comparison of VBN and TPB (Kaiser et al., 2005), survey data on conservation found TPB to have superior explanatory power (although both models were highly predictive), and that structural equation modeling revealed a proper fit to the data for TPB, but not VBN.

This stream of research remains unsettled. Inconclusive findings on the role of environmental values have given rise to new theories, which require further empirical testing. It seems clear from the record, however, that people often make decisions about environmental issues outside the conscious, volition framework envisioned by TPB, motivated instead by self identity or a strong set of general beliefs about the issue.
Other persuasion theories have had a far smaller impact on the study of environmental communication. Studies that have addressed fear appeals directly have mentioned protection motivation theory (Meijnders et al., 2001) or the extended parallel process model (Sorice, Flamm, & McDonald, 2007), but such references are few and far between. Process models have also been utilized in the study of environmental communication (Siero & Doosje, 1993), but the significance of the environmental issue in these studies is largely incidental and strategic.

The preceding summary is notable for a number of reasons. It is almost completely in the discipline of social psychology, and, to a far lesser extent, marketing and consumer psychology. In addition, the method used is almost always survey. A small number of experiments comprise the exception to this rule.

As the section on societal-level theories illustrated, the vast majority of environmental-related studies in the communication literature employ societal-level theories of persuasion. An important and notable exception is the relatively new risk information seeking and processing (RISP) model of behavior (Griffin, Neuwirth, Giese, & Dunwoody, 2002). This theory combines the TPB approach and the heuristic-systematic processing framework and proposes that the form of information processing applied to risk communications affects attitudes, beliefs and behaviors. In a modified RISP model, Kahlor (2007) more fully integrates the TPB framework by making information seeking the behavior/dependent variable of interest.

This line of research brings environmental communication solidly within the communication discipline by combining established theories and methods. It also illustrates one of the areas in which research needs to be expanded. These studies seek to fit a model to
empirical data related to an “environmental issue,” but the nature of those issues is fundamentally different. Griffin et al. (2002) examined attitudes toward the health of the Great Lakes among people who live directly on the lakes (Milwaukee, WI, and Cleveland, OH), whereas Kahlor (2007) looks at the issue of global warming. While often treated as a monolithic concept, “the environment” comprises a wide range of issues from very local to very distant. This distinction is especially important in light of the findings in social psychology that environmental values have different effects for different issues.

An important area for future study are the interactions among environmental issue type (local or distant), environmental values and specific environmental attitudes. Questions in this area are well suited for examination within the tradition of communication science. Significant opportunity exists to integrate social psychological theories of environmental decision making and traditional methods of media effects research. In particular, issue and message factors can be examined within the values-beliefs-behavior framework to determine when and why values play an important role. Message manipulations, a traditional communication science method, present an ideal approach for examining these relationships.
Efficacy

The concept of efficacy in social psychology is generally split into two types—response-efficacy and self-efficacy. This distinction can be traced to Bandura (1982), who observed that “people can give up trying because they seriously doubt they can do what is required or because they expect their effort to produce no results due to the unresponsiveness, negative bias, or punitiveness of the environment” (p. 140). He referred to these two concepts as “personal efficacy” and “outcome expectancies.” These basic concepts have primarily been explored in the context of fear appeals about health issues. Protection Motivation Theory (PMT) (Maddux & Rogers, 1983; Rogers, 1975) identified self-efficacy and response-efficacy as the two main determinants of peoples’ coping appraisals of threatening health messages.

Both types of efficacy have received a good deal of empirical investigation. For the purposes of this study, I will explore the concept of response efficacy in the context of persuasion. In particular, I will focus on studies where response efficacy was manipulated.

Neuwirth, Dunwoody and Griffin (1995) used PMT in the context of news reports about an environmental hazard. In this study, outcome severity, vulnerability and response efficacy were systematically varied in a story about the risks of fluorescent lighting lowering student academic performance. These three variables were found to have a non-additive effect on behavioral intention. In particular, message effects were strongest when all three were at their highest levels, providing solid support for PMT.
Response efficacy has also been studied in the context of skin cancer risk (Prentice-Dunn, Jones, & Floyd, 1997). This study grouped participants by their level of appearance concern and exposed them to messages high and low in benefits of tanning and high and low in efficacy information. Contrary to consistent findings that self- and response-efficacy are critical variables in health message effects (Rogers & Prentice-Dunn, 1997), the efficacy variable did not alter intentions in this study. The authors attributed this finding to the fact that intentions were high in both efficacy conditions, likely reflecting the widespread understanding that skin cancer can be prevented by the use of sunscreen.

Efficacy has been studied in conjunction with message framing and processing. Block and Keller (1995) used the issues of skin cancer and sexually transmitted diseases in an experiment that manipulated message frames (gain vs. loss) and perceived efficacy (low vs. high). Results indicated that in less certain conditions, loss-framed messages are more effective than gain-framed messages. This general finding has been supported in a good deal of health framing literature (Rothman, Bartels, Wlaschin, & Salovey, 2006). The primary contribution of the study, however, was identifying a possible mechanism underlying the impact of efficacy. The results indicated that less certain conditions (low response efficacy) motivate more in-depth processing. The authors argue that this in-depth processing favors loss-framed messages.

Kellstedt, Zahran and Vedlitz (2008) directly explored the relationship between personal efficacy and concern for global warming and climate change. Based on survey data, they found changes in personal efficacy produce effects on concern comparable to those due to environmental values. Indeed, their regression analysis indicated that when efficacy was
included in the model, the predictive power of environmental values decreased substantially, implying that personal efficacy may play a mediating role in the values-concern relationship. The possibility is strengthened by their exploratory finding that values are a significant predictor of personal efficacy. This supports the mediating role of efficacy based on causal steps mediation analysis (Preacher, Rucker, & Hayes, 2007).

Keller (2006) further examined the relationship between efficacy (self vs. response) and regulatory focus (promotion vs. prevention). Two experiments supported the idea that regulatory focus determines the salience of either self-efficacy or response-efficacy. The results indicate, Keller argues, that regulatory-efficacy fit can explain framing results in the health literature. Regulatory focus can be seen as interacting with message frames to enhance message persuasion and therefore intentions. That is, promotion focus may fit better with gain-framed messages and prevention focus may fit better with loss-framed messages. Keller cites Pennington and Roese (2003), who report that a promotion focus is associated with distant future events and prevention with near-future events. This line of research links the concepts of efficacy, regulatory fit and psychological distance.
Psychological distance

The exploration of the effects of psychological distance on behavior is based on construal-level theory (CLT) (Liberman & Trope, 1998; Trope & Liberman, 2003). The fundamental premise of CLT is that people construe distal objects at a higher level (more abstractly) and proximal objects at a lower level (more concretely). The psychological distance of objects (proximal or distal) can be conceived along four basic dimensions: spatial, social, temporal and probability. The nature of construal has been shown to effect actions and evaluations across a wide range of behaviors within each of these dimensions. The implications of this simple proposal are vast.

Construal levels have been found to impact several types of basic evaluations: primary, goal-related vs. secondary, goal-irrelevant sources of value; feasibility v. desirability; arguments in favor vs. arguments against an action; nonalignable vs. alignable attributes; and idealistic vs. pragmatic values (Liberman, Trope, & Wakslak, 2007).

The primitive, elemental nature of the CLT hypothesis makes it ideal for extension into other areas, both as a method to predict outcomes in new studies and to explain findings from past studies. In terms of social distance, the concept has been used in social impact theory (Latane, 1981), which holds that the strength, immediacy (distance) and number of social actors holding an opinion in a group will increase the conformity of others in that group. In terms of spatial distance, the idea of proxemics (Hall, 1963) has emerged as the study of spatial dimensions that influence human communication (Benjamin, 1997).

In the area of mass communications, social distance has been proposed as a psychological explanation for the third person effect (TPE). Social distance has been found to
play an essential role in the processing of messages and persuasion, consistent with TPE (White, 1997; White & Dillon, 2000). The more distant the referenced “other” in TPE studies, the stronger the effect. This “social distance effect” has been found to moderate TPE (Elder, Douglas, & Sutton, 2006). Explanations of this effect include the idea of fundamental attribution error, by which people see themselves as more influenced by situational factors and others as more influenced by personality traits (Gunther, 1991). Extending this explanation further, in the context of CLT, this effect can be seen as the result of low-level construals of self (concrete and complex, and therefore less influenced by persuasive messages) and high-level construals of others (loose and abstract, and therefore more influenced by persuasive messages) (Nan, 2007).

Different dimensions of psychological distance have been explored in the context of persuasion. In terms of temporal distance, research has found that persuasion is increased when distance is decreased, but that the effect is moderated by affect and involvement (Meyers-Levy & Maheswaran, 1992). In terms of spatial distance, studies have found that attitude change decreases linearly with physical distance from a speaker in a room (Albert & Dabbs, 1970). In a more recent application, persuasion was found to decrease with perceived physical distance in both computer-mediated communication and human-computer communication (Moon, 1999). Social distance has been examined in the context of consumer research, and the mere presence of another person in a retail setting has been found to influence persuasion (Argo, Dahl, & Manchanda, 2005).

The relationship between CLT and persuasion is also being explored directly. Nan (2007) found that construal level (operationalized as social distance) interacts with gain-loss message
frames in determining message effectiveness. This study found that the persuasive impact of gain-framed messages is stronger when viewed as socially distant (for others) and socially proximal (for self). Nan notes that CLT and message framing based on prospect theory, which has received a good deal of empirical support in communication studies, are conceptually related. Nan cites Eyal, Liberman and Trope (2004) to argue that gain frames are associated with higher levels of construal and loss frames are associated with lower levels of construals. This connection led to Nan’s basic hypothesis, which was supported, that gain frames are more persuasive when judgments are made of socially distant entities than for socially proximal entities.

As can be seen, the study of construal has links back to message frames. Research in this area has also linked the concept of distance to regulatory focus. Mogilner, Aaker and Pennington (2008) manipulated the regulatory frames of products and temporal distance. Results indicate that when purchases are temporally proximal, prevention-framed products are more desirable. Conversely, when purchases are far off in the future, promotion-framed products are perceived as more appealing. There appears, therefore, to be a strong fit, or even conceptual overlap, between construal level and regulatory fit. This idea is reflected in CLT findings on desirability vs. feasibility. When construal level is high, people are more disposed to desirability representations (or promotion-focus); when construal level is low, people are more responsive to feasibility representations (or prevention focus) (Liberman, et al., 2007).

These linkages illustrate the utility of CLT in understanding message effects. Psychological distance has been shown to interact with message frames and efficacy in effects
on intentions (and therefore persuasion). Another powerful aspect of the theory is that
distance can be represented along several dimensions. Recent studies have identified construal
levels as represented in idealistic values vs. pragmatic concerns. Kivetz and Tyler (2007) argue
that high-level (distant) construals promote the expression of an idealistic self, whereas low-
level (proximal) construals promote the expression of a pragmatic self. A series of five studies
supported this conceptualization. More temporally distant perspectives enhanced idealist self-
construals and temporally proximal perspectives activated pragmatic self-construals. As
referenced in the introduction, Trope et al. (2007) cite Fujita, Eyal, Chaiken, Trope and
Liberman (2008) as finding that temporal shifts affected the persuasiveness of value-related
versus value-neutral product appeals. As predicted by CLT, product evaluations made by people
considering a distant purchase were more positive when arguments were value-related. The
primary value-related argument used in this experiment was that the product (a DVD player)
was made with *environmentally friendly* materials.
Environmental values

The preceding summary of theoretical work in the area of psychological predictors of pro-environmental attitudes cited the importance of pre-existing environmental values in understanding this relationship. This section seeks to make further connections between environmental values, issue distance and perceived response efficacy.

Much of the work on values within psychology and sociology builds on the work of Milton Rokeach (1968), who in many ways launched empirical analysis of values. Rokeach defined values as “enduring beliefs that a specific mode of conduct is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence” (p.55). The Rokeach Value System was elaborated by others, notably Schwartz and Bilsky (1987, 1990), who developed the Schwartz Value System, which is now the most common measure of values (Dietz, Fitzgerald, & Shwom, 2005). This survey contains 56 items that participants rate in terms of importance as a guiding principle in life. Items in the Schwartz Value System have typically factored into 10 types: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity and security. These ten value types are further arranged into groups that represent dimensions of self-enhancement versus self-transcendence and traditionalism versus openness to change.

In the more specific area of environmental values, Stern et al. (1995) shortened the survey to 15 items, and modified it to better capture the theoretical distinction between humanistic and biospheric altruism. Schultz (2001) and others have further refined measurement of environmental values into a 12-item scale of egoistic, altruistic and biospheric
concerns. (This measure is used in the current study and will be discussed in somewhat more
detail in the measures section.)

These measures fit the hypothesized theoretical structure of values-beliefs-norms (VBN)
theory of environmental concern (Stern, 2000; Stern & Dietz, 1994), which assumes that self-
interest, altruism and biospheric altruism are at the beginning of a psychological chain that
determines environmental behavior. So while these value clusters are critical in determining
how people make decisions about the environment, their effect is not direct. The model posits
that the link between values and action is mediated by more specific beliefs, awareness of
consequences and responsibility, personal efficacy and social norms.

Given the importance of values to environmental behavior, some researchers have
argued that pro-environmental messages should be tailored (or framed) around the value-sets
dominant within a particular cultural context (Schultz & Zelezny, 1999). In societies that value
self-interest, such as the United States, the argument goes, messages should appeal to egoistic
concerns, whereas in less individualistic societies the focus should be more altruistic. This idea
is at the center of a current debate within applied environmental organizations.

The controversy revolves around the relative merits of the so-called “marketing
approach” to environmental messaging. This approach, alluded to in the introduction, looks at
environmental behaviors as products to be sold. The choice should be made “easy” for
consumers by offering tangible, personal benefits at a low cost (in terms of money or personal
sacrifice). A detailed report from WWF-UK, written by Tom Crompton, explores the
shortcomings of this approach (2008). The report distinguishes between extrinsic and intrinsic
goals as critical message factors. Whereas intrinsic goals are inherently rewarding to pursue (personal growth, emotional intimacy, community involvement), extrinsic goals (acquisition of material goods, social status) do not lead directly to satisfaction, but require responses of others. Research is cited that demonstrates the superiority of intrinsic goals in effecting long-term behavior change (Vansteenkiste et al., 2004). These findings suggest appeals to values (intrinsic goals) will be more successful than the marketing approach (extrinsic goals) in fostering the difficult long-term behavior changes necessitated by the global warming crisis.

Another criticism of the marketing approach is that “small-step” messages of environmental groups will be drowned out in the ever-growing din of green product appeals. What is needed, therefore, are “big-step” messages that appeal to core values and identities. A more appropriate metaphor for the challenges of the environment movement, the WWF report argues, is that of political communication. Political scientists have argued that people vote based on their identities, not their self-interest. The notion that the conventional wisdom of pushing “pocketbook issues” is too limited to explain voter behavior emerged beginning in the 1980s (Kinder, Adams, & Gronke, 1989). More recently, George Lakoff (2004), a cognitive scientist, and Drew Westen (2007), a psychologist, have emphasized the need to appeal to core values in political campaigns, not to narrow self-interest, and to provide new metaphors to create shared meanings that support specific political programs.

The link between this line of research and environmental communications is the concept of response efficacy. As is argued in the WWF report, the issue of global warming, much like a presidential election, presents people with outcomes over which they have very
little direct control, a very low level of response efficacy. The recycling efforts of one person will
do very little to reduce global warming, just as one person’s vote does little to effect a change
in government policy. When efficacy is low, it is argued, intrinsic appeals will be far more
effective than extrinsic appeals.

Recent research supports the importance of values in motivating environmental
behavior change, but, as the report points out, there is no single explanation for the
psychological mechanism by which this occurs. In addition, this basic line of argument assumes
that more distant issues, such as global warming, elicit lower levels of perceived response
efficacy, a hypothesis that has not been tested. The current experiment provides direct
empirical examination of the relationship between issue distance and efficacy, and explores a
possible mechanism by which values affect attitudes—level of idealistic construal.
Hypotheses

Based on recent trends in marketing and environmental organizations and prior research in environmental sociology and psychology, this study will examine the roles of environmental values, issue distance (global versus local) and efficacy in predicting attitudes toward a specific environmental behavior and behavioral intentions. The study proposes that construal level is an important mediating variable in this relationship, and may represent one underlying mechanism by which values are translated into attitudes and actions.

The original proposed hypotheses and research question for the study are as follows:

H1a: For a proximal (local) environmental issue, psychological construal will be lower, pragmatic representations will be more prominent and environmental concern will not predict changes in environmental attitudes and behavioral intentions in response to a pro-environmental advocacy advertisement.

H1b: For a distal (global) environmental issue, psychological construal will be higher, idealistic representations will be more prominent and environmental concern will predict changes in environmental attitudes and behavioral intentions in response to a pro-environmental advocacy advertisement.

H2a: For a proximal (local) environmental issue, changes in environmental attitudes and behavioral intentions in response to a pro-environmental advocacy advertisement will be greater when efficacy is high than when efficacy is low.

H2b: For a distal (global) environmental issue, changes in environmental attitudes and behavioral intentions in response to a pro-environmental advocacy advertisement will the same when efficacy is high and when efficacy is low.

RQ1: Is type of processing of an environmental advocacy advertisement (systematic v. heuristic) more affected by level of construal or level of perceived efficacy.
As pointed out by the committee during the proposal defense, H1 and H2 are related, and, in the interest of clarity and parsimony, should be restated. In addition, the hypothesized role of psychological construal, treated in a subordinate clause in H1, should be made explicit in a separate hypothesis.

In essence, the two main proposed hypotheses predict a three-way interaction among values, issue distance and efficacy in their effect on attitudes and behavioral intention toward an environmental issue, with construal level mediating the relationship. For clarity, H1 and H2 can be restated as follows:

**H1:** Environmental values will be a stronger predictor of environmental attitudes and behavioral intentions for distal (global) issues than for proximal (local) issues.

**H2:** Efficacy will be a stronger predictor of environmental attitudes and behavioral intentions for proximal (local) issues than for distal (global) issues.

In addition, the mediating role of construal level is predicted as follows:

**H3:** The relationship between environmental values and environmental attitudes and behavioral intentions is mediated by construal level, such that people with higher levels of environmental values will construe issues in more idealistic terms and exhibit more positive environmental attitudes and behavioral intentions.

This revised construction raises two related research questions:

**RQ1:** What effect do issue distance and message efficacy have on the relationship between environmental values and construal level?

**RQ2:** What effect do issue distance and message efficacy have on the relationship between environmental values and perceived efficacy?

Finally, the original research question can still be addressed, but because it is less theoretically relevant, it is relabeled:
RQ3: Is type of processing of an environmental advocacy advertisement (systematic v. heuristic) more affected by level of construal or level of perceived efficacy.
Method

To address the relationships summarized in the preceding section, I conducted a 2 x 2 between-subjects factorial experiment with random assignment to conditions. This basic design assumes the pre-experimental equality of the groups in all possible independent variables. History and maturation effects were controlled by the short time between the manipulation of the independent variables and the measurement of the dependent variable. Because none of the participants were used in analysis prior to the experiment, there was no possibility of contamination due to pretesting. Empirisoft MediaLab™ software randomly assigned participants to experimental conditions to ensure equal cell sizes. This basic approach is considered by many to be the best all-around design (Kerlinger & Lee, 2000).

Sample

Students were recruited from five different classes at a large Mid-Atlantic university during the spring of 2008. Four of the classes were in communications and one was in the school of business. Students were recruited in person and/or via email for participation in a study of “values and persuasion.” The recruitment materials deliberately avoided mention of environmentalism to prevent possible priming of subjects. Students were informed that the study would be administered in the Media Effects Research Lab and that they would receive extra credit in exchange for their participation. Interested students were provided instructions for an online sign-up page where they selected the date and time most convenient for them. Reminder emails were sent to all participants the evening prior to their scheduled appointment and the participation rate among those who signed up was 82%.
A total of 227 students participated in the study. Reflecting the make-up of the communications department student body, the sample was 62.1% female and 38.9% male. In terms of ethnicity, participating students were 81.1% White/Non-Hispanic, 4.4% Black/African American, 3.5% Hispanic/Latino, 5.7% Asian, 2.6% Multiracial and 2.6% Other. Participants were all undergraduates and were 35.4% freshmen, 20.5% sophomore, 16.7% juniors and 25.6% seniors.

**Stimulus Materials**
The stimulus materials for this experiment were four video environmental advocacy advertisements. The issue addressed in the ads was support for an environmental advocacy group fighting for passage of pending environmental legislation (in the local conditions) or of an environmental treaty (in the global condition). Support for an advocacy organization was chosen for ecological validity. Because many students at the university are from out of state, the action being advocated in the local condition could not be voting on a local referendum. Students not registered to vote in the area would immediately view the message is irrelevant for them. Supporting an organization fighting for the cause, however, is something anyone could get behind (or not).

The basis of the local issue was air quality degradation due to increased development and traffic in the area. The specific threat mentioned was photochemical smog, resulting in reduced visibility, asthma and emphysema. Evidence was an EPA report predicting that the area is one of only 345 in the country that will fail to meet new air quality standards. The solution
advocated was support for new state law limiting emissions that would work to prevent the threat.

The basis for the global issue was global warming due to increased development and traffic worldwide. The specific threat mentioned was human-caused climate disruption, resulting in raising seas, crop failures and species extinction. Evidence was the Nobel Prize-winning IPCC report that there is no longer any reasonable doubt that aggressive action is necessary to prevent serious damage. The solution advocated was support for an international treaty limiting emissions, which would work to prevent the threat.

All efforts were made for the text of the ads to be exactly the same except for the manipulated dimensions of distance and efficacy. Full scripts for the ads for each of the four treatment conditions are shown in Appendix A. The four experimental conditions are summarized in Table 1 as follows:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Distance</th>
<th>Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Local</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>Local</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>Global</td>
<td>High</td>
</tr>
<tr>
<td>4</td>
<td>Global</td>
<td>Low</td>
</tr>
</tbody>
</table>
Efficacy was manipulated within the advertisement, and in the text screens introducing them. This was also done for ecological validity. It would be unrealistic for an advocacy organization to purposefully communicate a low-efficacy message. Therefore, introductory material for the low- and high-efficacy conditions was varied in an attempt to raise or lower participants’ perceived response efficacy. The efficacy manipulation was also present in the ads themselves, but the manipulation was phrased more realistically. In the low efficacy conditions viewers were told “Solutions to complex problems are never easy, but we must still do everything we can!” In high efficacy conditions they were told “The solution is within our reach and the time to act is now!” These more subtle manipulations were designed to reflect and reinforce the stronger efficacy manipulations in the introductory text. All four advertisement introduction screen sequences are shown in Table 2.
Table 2
Stimulus material introductory screen text for four treatment conditions

<table>
<thead>
<tr>
<th>Local Conditions</th>
<th>Global Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Efficacy</strong></td>
<td><strong>Low Efficacy</strong></td>
</tr>
<tr>
<td><strong>ADVOCACY AD</strong></td>
<td><strong>ADVOCACY AD</strong></td>
</tr>
<tr>
<td>The following advocacy advertisement asks you to support an organization fighting for the passage of specific proposed environmental legislation.</td>
<td>The following advocacy advertisement asks you to support an organization fighting for the passage of a specific proposed environmental treaty.</td>
</tr>
<tr>
<td><strong>NEW ENVIRONMENTAL LEGISLATION</strong></td>
<td><strong>NEW ENVIRONMENTAL TREATY</strong></td>
</tr>
<tr>
<td>Pennsylvania state lawmakers are currently considering legislation to protect air quality in the Happy Valley area.</td>
<td>Nations participating in the upcoming Copenhagen Climate Council are considering a treaty to prevent global warming.</td>
</tr>
<tr>
<td><strong>IT WILL BE 90% EFFECTIVE</strong></td>
<td><strong>IT WILL BE 10% EFFECTIVE</strong></td>
</tr>
<tr>
<td>Because this environmental legislation is among the most aggressive and comprehensive in the US, the PA Department of Environmental Protection and local environmental groups have reported it will be 90% effective in successfully reducing the emissions that threaten local air quality.</td>
<td>Because of significant additional truck traffic moving through the area on the soon-to-be-completed Interstate 99 highway, the PA Department of Environmental Protection and local environmental groups have reported the new law will only be 10% effective in successfully reducing the emissions that threaten local air quality.</td>
</tr>
<tr>
<td><strong>FOLLOWING THE AD</strong></td>
<td><strong>FOLLOWING THE AD</strong></td>
</tr>
<tr>
<td>After viewing the advertisement, you will be asked for your opinions and attitudes about the message, the proposed legislation and the sponsoring advocacy organization.</td>
<td>After viewing the advertisement, you will be asked for your opinions and attitudes about the message, the proposed treaty and the sponsoring advocacy organization.</td>
</tr>
</tbody>
</table>
The advocacy advertisements were produced using professional video and audio editing software. The voiceover was read by a female faculty member from the university who is also active in local community theater. Audio software was used so that the exact same voiceover is used across all four conditions, except where text differed along the manipulated distance and efficacy dimensions. For example, in the following sentence, the italicized text was from the same voiceover, and the manipulated text was spliced in as needed: “The Pennsylvania/Global Air Quality Foundation is fighting for adoption of this legislation/new treaty through lobbying, public relations and citizen action.”

A similar approach was taken for the background images and onscreen text in the advertisements. The local conditions opened with an overhead wide angle shot of the local area, and the global conditions opened with an image of the earth from space. As the risks of smog and global warming were introduced in the voiceover, the local shot faded to an image of a smog-filled valley, and the globe faded to a thermal image of warming zones. When the voiceover moved on to discussion of the causes of increased emissions, both conditions showed the same images of residential construction and highway traffic. These images were chosen specifically because they realistically represented the kind of development and traffic illustrative of the local area and of the world in general. As evidence was introduced the local conditions displayed the EPA logo and the global conditions displayed the IPCC logo. The next screen was white text on a black background displaying the risks (three specific risks in each condition). As the voiceover introduced the proposed solutions, the local conditions displayed an image of the state capital building (with a caption indicating the location) and the global conditions displayed an image of Copenhagen (with a caption indicating the location). All
conditions then displayed the text “With your support, we can win this fight!” Finally, as the voice over called on viewers to visit the organization’s website for more information and to find out how to help, the screen faded to the organization’s URL in white text on a black background, www.cpaqf.org for the local conditions and www.gaqf.org for the global conditions.

All four ads were approximately the same length in terms of word count (from 173 to 180 words) and duration (all ads were with two seconds of 120 seconds). Ads were formatted to play as Windows Media files at medium resolution. On the 19-inch monitors used in the lab, these video files displayed in windows that were approximately 3.5 inches diagonally, similar to a YouTube or other online video, a format with which college students are certainly familiar. All the images and text were clear and easy to read. Multimedia files are integrated into MediaLab and the video windows displayed within the same program interface as the rest of the survey. Videos played smoothly, with no halting or jerking of the image or audio. After being instructed to put on their earphones, participants clicked continue and the video started automatically. When complete, the software automatically advanced to the next instruction screen, which said “You will now be asked some questions about your attitudes and opinions toward the ad and the issue it addressed.”

Pretest Results
The stimulus materials for the experiment were pretested to determine if the manipulations of distance and efficacy would have the desired effect. The advertisements were introduced with a PowerPoint presentation, read by the researcher, which provided the efficacy manipulation in
a similar fashion to how it would be delivered in the final experiment. The advocacy advertisements were shown to four different communications classes, ranging in size from 12 to 19, for a total sample of 67. Participants were shown and read the introductory material, viewed the ads and completed a one-page questionnaire. The entire pretest took approximately 15 minutes to complete.

In addition to the manipulation checks for distance and efficacy, the pretest was used to determine if one version of the ad was perceived as being significantly more engaging or dynamic. It also asked participants to estimate how much the proposed action might end up costing them personally, to test if one condition was perceived as significantly more risky in terms of potential personal costs. These checks were designed to ensure that only those factors manipulated by the researcher were impacting survey results.

The manipulation check for issue distance consisted of a single item: “What type of issue would you say was addressed in the ad?” The response options ranged from 1 for “Local Issue” to 7 for “Global Issue.” As expected, an independent sample t-test showed that participants in the global conditions viewed the issued addressed as more global (M=6.3, SD=1.2) than participants in the local conditions (M=2.4, SD=1.3), t(65)=-13.1, p<.001.

The manipulation check for perceived efficacy comprised three items, each with response items ranging from 1 for strongly disagree to 7 for strongly agree: “Photochemical smog/global warming is preventable,” “Enforcement of stricter emissions standards can prevent photochemical/global warming,” and “Photochemical smog/global warming will be difficult to prevent.” Reliability analysis of these three items indicated that the scale would be
significantly improved with removal of the third item. This was likely an artifact of it being the only reverse coded item in the scale. The first two items were reliable with a Cronbach’s alpha of .85. These two items were averaged to analyze the efficacy manipulation. An independent sample t-test showed that participants in the high efficacy conditions had higher perceived efficacy relative to the issue ($M=5.2$, $SD=1.0$) than participants in the low efficacy conditions ($M=4.6$, $SD=1.4$), $t(65)=-1.8$, $p<.05$ (one-tailed test). Although the difference in means between the groups was less than 1 point on a 7-point scale, and the differences were only marginally significant, it was expected that efficacy would be more difficult to manipulate than distance. In general, the pretest results supported the idea that perceived efficacy was being influenced by the stimulus materials to some degree.

Overall perceived ad dynamism was measured with four 7-point semantic differential items for not dynamic/dynamic, not engaging/engaging, not exciting/exciting and not stimulating/stimulating. These four items were highly reliable (alpha=.93) and an averaged item was created to compare the four ads on this dimension. One-way ANOVA revealed no significant differences among the groups.

The final question asked participants to estimate how much adoption of the legislation/treaty might cost the average person. As may be expected with this type of open-ended question, especially among a younger audience, responses varied greatly, from $20 to $10,000. However, one-way ANOVA indicated there were no significant differences among the conditions. Pretest results therefore indicate no significant differences in perceived potential costs between the treatment conditions.
Based on the results of the pretest, the experiment preceded without any changes to the content of the stimulus materials.

**Assessing Environmental Values**

Prior to an overview of the variables and measures employed in this study, additional detail is provided on the two scales used to measure the critical concept of environmental values—the New Ecological Paradigm (Dunlap, Van Liere, Mertig, & Jones, 2000) and the three-factor Environmental Concern scale developed by Schultz (2001) based on Stern and Dietz’ values-based model of environmental behavior (1994).

The New Ecological Paradigm (NEP) scale is the closest thing to a “standard” measure of environmentalism in sociology, and the Environmental Concern (EC) scale was designed specifically to capture dimensions of personal values theorized to antecede and predict specific environmental attitudes. The two measures were included in order to compare and contrast, as well as to capture slightly different dimensions of the concept of environmentalism. Additional background on the origin and nature of these two scales follows.

Dunlap and Van Liere, the original developers of the NEP, argue that it can be treated as a unidimensional measure of “environmental concern,” a concept they themselves acknowledge is both “incredibly complex” (Dunlap & Jones, 2002, p. 488) and “somewhat amorphous” (Dunlap et al., 2000, p. 429). Since its development in 1978, the scale has become the most widely used and assessed measure of environmentalism (Stern et al., 1995). The scale’s track record is long, but the precise nature of the concept it measures remains vague, as does its relationship to other attitudinal concepts and theories.
Measuring the concept of environmental concern was not the NEP’s original intent. The scale was developed in response to the anti-environmental thrust of society’s dominant social paradigm (DSP). The original NEP can be described as subjectively constructed. That is, it was not designed to measure variables associated with existing attitude theory, nor was it methodologically constructed through post-hoc analysis of factor loadings. Dunlap and Van Liere conceived the scale as capturing key elements of an emerging “environmental worldview” (a reaction to the DSP) and designed the items to reflect three beliefs they thought representative of this view: man’s ability to upset the balance of nature, the existence of limits to growth, and humanity’s right to rule over the rest of nature. Over time, they came to regard the scale as measuring “primitive beliefs” about people’s basic relationship with nature (Dunlap & Jones, 2002). This primitive belief is what they now refer to as “environmental concern.”

Twenty years after its introduction, the scale developers modified the NEP to reflect five sub-concepts (as opposed to the original three), while still arguing that it measures one construct (environmental concern). Conceptually, the NEP scale (Dunlap et al., 2000) comprises three items each for the five sub-concepts of: limits, eco-crises, anti-exemptionalism, anti-anthropomorphism and balance.

1. Limits:
   a. We are approaching the limit of the number of people the earth can support.
   b. The earth has plenty of natural resources if we can just learn how to develop them.
   c. The earth is like a spaceship with very limited room and resources.

2. Eco-Crises:
   a. Humans are severely abusing the environment.
   b. The so-called “ecological crisis” facing mankind has been greatly exaggerated.
c. If things continue on their present course, we will soon experience a major ecological crisis.

3. Anti-Exemptionalism:
   a. Human ingenuity will ensure that we do NOT make the earth unlivable.
   b. Despite our special abilities humans are still subject to the laws of nature.
   c. Humans will eventually learn enough about how nature works to be able to control it.

4. Anti-Anthropomorphism:
   a. Humans have the right to modify the natural environment to suit their needs.
   b. Plants and animals have as much right as humans to exist.
   c. Human beings are meant to rule over the rest of nature.

5. Balance:
   a. When humans interfere with nature it often produces disastrous consequences.
   b. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
   c. The balance of nature is very delicate and easily upset.

Multidimensionality will continue to be an issue for the NEP because of the approach taken by its developers. They argue that if multiple factors emerge in any one study, researchers can treat them as such; if one factor emerges, so much the better. Others argue that the very idea of a single environmental concern construct is unattainable and should be abandoned (deHaven-Smith, 1991). To address this issue, Dunlap et al. (2000) employed a factor analysis of data from a 1990 mail survey to a representative sample of Washington State residents. This sample completed the questionnaire that comprised the 15-item revised NEP. The authors argue that the strong internal consistency of the scale, and the fact that all 15 items loaded heavily on the first un-rotated factor, is evidence that the scale is measuring a single construct. The rotated factors did not clearly yield the five sub-concepts the developers intended.
It seems natural to question the validity of a scale developed to capture three concepts that is now used to measure a different unidimensional concept. However, whether accidentally or on purpose, the scale has proved a reliable and valid measure of some general concept of environmental values. Some researchers have characterized the construct being captured by the NEP as “folk ecology” (Stern et al., 1995). Dunlap has sought to further explicate the idea of environmental concern to bring conceptual clarity to what the NEP is measuring. Dunlap and Jones (2002) draw upon Louis Guttman’s facet design approach in a comparison of several measures that capture some aspect of environmental concern. Normally employed prior to designing a scale, facet theory is employed here after the fact to evaluate how well these scales capture the concept. While such an approach may appear self serving, it does yield a number of useful critical distinctions. The authors distinguish between the “environmental” aspects of the concept and facets that are implied by “concern.” Environment can comprise individual objects or categories of physical phenomena, which can also be conceived along dimensions of specificity, time and space. The authors point out that the failure to take such differences into account (for example, lumping all “environmental” issues together) has been responsible for inconsistent results and unfounded interpretations of data. Concern is further defined as based on outcomes related to existing attitude theory (beliefs, attitudes, intentions, etc.) or on outcomes related to specific policy issues identified by the researcher.

It is based on this explication of environmental concern—a unidimensional but complex concept with multiple facets—that the authors would choose to have the NEP evaluated. Based on the foregoing, the NEP can be considered a flawed but useful proxy for a general latent
construct reflecting an individual’s environmental worldview. As the authors’ themselves point out, the scale does not fully capture the latent construct (few scales do), and it specifically fails to consider the conative and behavioral aspects of “concern.” In addition, the multidimensionality of the measure continues to the subject of debate.

The authors have also sought to situate the construct being measured by the NEP in the context of attitude theory. This is clear from their assertion that the NEP is measuring a “primitive belief,” as defined by Rokeach (1968). Within this framework, environmental concern would have to be considered a primitive belief with zero consensus. As defined by Rokach, the items that comprise the NEP, such as “Humans are severely abusing the environment,” could not be considered primitive beliefs with 100 percent consensus. It is highly probable that at least one person in an individual’s reference group would have a different opinion on such an item. Primitive beliefs with zero consensus are learned through direct experience with the object (the environment) and are incontrovertible, or impervious to persuasion or argumentation by others. Dunlap and Van Liere, however, acknowledge that environmental problems have become less directly observable, and therefore are learned more through the media and other interactions. In addition, the validity of the NEP rests on studies that demonstrate people’s environmental concern is subject to change from persuasive arguments. It seems fair to argue, therefore, that NEP is measuring some other type of belief in the Rokeach framework. The most “primitive” level the NEP could achieve in this regard is that of an authority belief. This type of belief helps an individual round out his or her view of the world as rationally as possible, but is subject to change.
As central, but not primitive, to a belief system, the NEP can be conceived as having a significant impact on other beliefs and attitudes. But because NEP items may be learned through the media, and therefore fail to meet one of Rokeach’s main definitional criteria, it is possible that some items could be considered akin to matters of taste—as something people choose to believe just because that’s what they choose to believe. Such beliefs may be very easy to change (especially based on direct experience) and have minimal impact on other beliefs.

Based on this classic definition of attitudes and belief systems, it is hard to support the assertion that the NEP somehow automatically reflects primitive beliefs. It is easy to see how, in some cases, these items could represent strong, central beliefs. But then again, in some cases, it is easy to see how they may be inconsequential or fleeting.

The NEP’s unconventional background in some sense accounts for its longevity. Based on its original purpose, to reflect environmental beliefs that are in opposition to the DSP, the items that make up the scale were conceived in broad social terms. Scales developed more specifically to measure support for environmental initiatives, and therefore more focused on specific issues and events, began to appear dated as new issues emerged (Maloney & Ward, 1973; Weigle & Weigle, 1978). But the NEP scale’s atheoretical background has also been something of a shortcoming. While Dunlap and Van Liere can argue that the NEP measures central beliefs (the empirical evidence is mixed), they cannot argue that the construct measured by the scale plays a central role in attitude-behavior theories based on the tripartite model of attitudes.
Some approaches to attitude structure and environmentalism consider general values as forming part of the inter-attitudinal structure (Eagly & Kulesa, 1997), which describes the relationship between a belief and other related beliefs and values. It is within this framework that the role of environmental concern has been most directly addressed. However, the best-known research of this type measures environmental concern with a different scale (Stern, 2000; Stern & Dietz, 1994; Stern et al., 1995; Stern, Dietz, Kalof & Guagnano 1995). These studies conceive a tripartite structure of environmental concern: egoistic, altruistic and biospheric. The NEP, in this model, is viewed as a reflection of environmental beliefs, not the more “primitive” and values-driven concept of environmental concern. The (NEP) scale developers affirm that NEP can be seen as a fundamental component of these “values-beliefs-norms” models (Dunlap & Jones, 2002), and that the scale can be used as both a dependent and intervening variable, depending on the nature of the study.

The NEP was included in this study because it is widely used, and two scales were used in the event that one or the other was unreliable. In addition to the NEP, a more primitive measure of environmental values was desired. Schultz’s three-factor Environmental Concern (EC) scale bridges the gap between primitive personal values (as measured by Schwartz’s Value Survey) and more specific environmental worldviews (as measured by the NEP). Whereas the NEP captures the concept of environmental concern as the interrelationship of humanity and nature, the EC refers more directly beliefs about the interrelationships between self and nature (Schultz et al., 2005)
In a series of studies, Schultz developed and tested a scale that would assess each of the sets of valued objects related to environmental concern (Schultz, 2001). The scale asks: “People around the world are generally concerned about environmental problems because of the consequences that result from harming nature. However, people differ in the consequences that concern them most.” Participants are then asked to rate each of the following items from 1 (not important) to 7 (very important): Egoistic items; Me, My lifestyle, My health, My future: Altruistic items; People in my country, All people, Children, Future generations: Biospheric items; Plants, Marine life, Birds, Animals.

Based on a sample of 1,010 psychology undergraduates from several large US universities, Schultz analyzed the results for one-, two- and three-factor models. Results of confirmatory factor analysis indicated the three-factor model best fit the data. Alpha reliabilities for the three factors were: egoistic items, 0.71; altruistic items, 0.64 and biospheric items, 0.86. A second sample of 1,005 California adults also showed that a three-factor model provided a significantly better fit than a two-factor model. Alpha reliabilities for the three factors were: egoistic items, 0.88; altruistic items, 0.90 and biospheric items, 0.90. The EC scale was also compared and contrasted with seven other measures of environmentalism, including the NEP. The EC sub-scales were significantly correlated with these other measures. Finally, the EC scale was administered to students from universities in 10 Spanish-speaking countries (Colombia, Costa Rica, El Salvador, the Dominican Republic, Ecuador, Panama, Paraguay, Peru, Spain and Venezuela). In addition to the EC, this survey included the NEP, a scale of environmental behavior and a 37-item version of Schwartz’s value scale. Results strongly supported the notion that values underlie environmental concerns and worldviews. Egoistic
concerns were positively correlated with self-enhancement values and biospheric concerns were correlated with self-transcendent values (Wesley Schultz, et al., 2005). This finding has been replicated in other studies of the relationship between values, particularly as measured by Schwartz’s values scale, and concern about the environment (Schwartz, Sagiv, & Boehnke, 2000).

The NEP and EC scales represent two reliable and robust approaches to measuring an individual’s general level of environmentalism. Of the two, the EC scale is further along the continuum toward general values, while the NEP is more a measure of specific environmental beliefs. Both measures will be administered and analyzed in this study, but assuming adequate reliability, the EC, and more specifically the subscale of biospheric concern, will be the focus of analysis as representing an individual’s primitive psychological relationship with nature.

**Variables and Measures**

Several measures were included in the final experimental survey instrument. Although not all of these variables and measures will be used in the data analysis, results and discussion that follow, they will all be discussed in this section. In addition to detailing the items and measures employed, detail will be provided on the order of the items in the survey, and, where applicable, the auto-randomization of survey items. The entire survey, reformatted for paper presentation, can be found in Appendix B.

The first section of the survey, following an initial set of instructions, focused on basic demographic information. Items included gender, ethnicity, age, academic year and estimated family income.
The next section was designed to measure environmental values using the EC scale. In order to limit priming effects, “dummy” scales related to the issues of Social Security reform and gun control were included along with the EC scale. Later in the experiment, prior to viewing the stimulus materials, participants were told they would view an advocacy ad related to a social issue. This design was used to create the impression that the ad could be about any of the three social issues covered in the survey. The order the sets of scales (Social Security, environment and gun control) was randomized. In addition, the items within each scale were randomized to eliminate order effects. The wording and format of the Social Security and gun control questions mirrored the wording and format of the EC scale. That is, participants were asked about the importance of a series of one- or two-word items to their concern about the issue on a scale of 1 (not important) to 7 (very important). The 12-item EC scale was embedded in this section of the survey along with a set of six questions about Social Security and six questions about gun control.

Respondent political identity was the focus of the next set of questions. Participants were asked “I consider myself a _____,” and were provided options ranging from strong Democrat to strong Republican. They were also asked how they were registered and which party’s candidate they were planning to vote for in the upcoming presidential election. Finally, they were asked to place themselves on a 7-point scale of political conservatism, ranging from extremely liberal to extremely conservative. These items will prove useful for future analysis looking at political identity and reactions to environmental messages.
Respondent trait level of materialism was assessed using a modified version of a scale original to Richins (1987). These five Likert-type items capture the importance a person places on material things and how strongly they believe that material things bring happiness. As mentioned above in the review of literature related to cultivation theory, materialism is negatively correlated to environmentalism. It should also be noted that materialism, as conceived in this scale, has the opposite meaning of materialism as conceived by Inglehart in his materialist/postmaterialist values shift. Inglehart used the term to refer to an existence focused on the acquisition of the minimal material things necessary for life: food, shelter safety. This type of materialism is at the very lowest level of a Maslowian hierarchy of needs. The scale used here is aimed at a much higher level of needs and implies that people may consume in order to satisfy needs for self-identity and transcendence (indeed, such an analysis is central to a large literature on the challenges for pro-environmental organizations). So what is often referred to as materialism would be classified as postmaterialism by Inglehart. This scale will be used to check the convergent validity of the EC and NEP measures (a negative correlation is expected), and as a possible moderating or mediating variable. Although in-depth work on materialism indicates the construct is multidimensional (Richins & Dawson, 1992), its significant correlations with other measures of the concept support its convergent validity, which is its primary propose in this study.

Need for cognition, a relatively standard measure of a person’s tendency to enjoy effortful information processing, was also measured in this study. Originally developed by Cacioppo and Petty (1982), the scale is composed of 18 Likert-type items and has a record of being highly reliable. For example, a composite reliability of .88 was reported by Ailawadi,
Neslin and Gedenk (2001). The scale is included here primarily because of its frequent utility as a control variable, and its possible use in analysis of respondent information processing (not the focus of this initial data analysis, but a possible future application of the dataset).

After need for cognition, the survey again embedded a measure of environmentalism along with questions related to Social Security and gun control. In this case the environmental measure was the NEP. As in the earlier section of the survey, the order of the issues (Social Security, environment and gun control) was randomized, as were the items within each set of scales. The 15-item NEP was embedded with five questions on Social Security and five questions on gun control. As with the EC scale, the questions on these “dummy” issues were phrased in formatted in a manner similar to the questions that make up the NEP.

After completing these sets of scales, participants were introduced to the stimulus materials using the information screens described above. After viewing the stimulus ads, participants were automatically forwarded to a screen that said “You will now be asked some questions about your attitudes and opinions toward the ad and the issue it addressed.”

The first question after the stimulus was an open-ended cognitive response. The question was phrased as follows: “Please write down up to 5 thoughts / feelings you had when you watched this environmental advocacy advertisement. State your thoughts and ideas as concisely as possible. A phrase is sufficient. Ignore spelling, grammar, and punctuation. Use the enter (return) key to separate your thoughts. Please take 2-3 minutes to do this.” A text box was provided for them to enter their response. Thought responses can be coded in a number of ways, for example cognitive versus affective responses (L. J. Shen & Dillard, 2007). Although not
analyzed in depth in this report, thought responses represent a valuable variable for additional applications of the data, in particular in explorations of the effect of information processing on responses to environmental messages.

Following the cognitive response question, participants completed four items measuring their familiarity with and attitude toward environmental issues prior to seeing the message. These items were designed by the researcher and were included as possible controls.

Perceived ad involvement was assessed by four items designed to measure self-reported central processing level of some stimuli (Lord, Lee, & Sauer, 1994). Reported alpha levels have been in the range of .89 to .93 (Lord, et al., 1994; Lord, Lee, & Sauer, 1995). This measure is included as an indicator of self-reported processing level.

A number of dependent measures common to communications study were also included to increase the utility of the dataset. Attitude toward the ad measures were adopted from Bruner (1998). Three sets of four semantic differential items were designed to assess responses to the advocacy advertisements in terms of cognition (uninformative/informative, not clear/clear, incomplete/complete and meaningless/meaningful), liking (boring/interesting, unappealing/appealing, unattractive/attractive and overall disliking/overall liking) and perceived persuasiveness (not at all persuasive/persuasive, unconvincing/convincing, not all effective/effective and weak/strong). These measures were included as possible alternative dependent, moderating or mediating variables in the analysis.

Ad credibility was measured with four semantic-differential items adopted from Gurhan-Canli and Mahewwaran (2000): not at all believable/believable, not at all
true/absolutely true, not at all acceptable/acceptable and not at all credible/very credible. This scale is designed to capture the extent to which some specific information to which an audience has been exposed is viewed as being true or acceptable. In a series of studies, Gurhan-Canli and Mahewwaran (2000) reported reliability ranging from .77 to .87. Again, this measure was included as a possible dependent, moderating or mediating variable.

Negative affect was measured using five items adopted from Watson, Clark & Tellegen (1988). A 7-point Likert-type scale (ranging from “not at all” to “a lot”) was used to indicate how the ad made participants feel afraid, tense, nervous, anxious and uncomfortable. Mano and Oliver (1993) compared this scale with many other measures of affect and confirmed its discriminant and convergent validity. Although the stimulus materials in this experiment were not designed or expected to produce much fear, a measure of negative affect was desired.

The primary dependent variables of attitude toward the behavior being advocated and behavioral intention were assessed with a total of seven Likert-type items designed by the researcher, but reflective of variables commonly used in communications research. Two items were designed to measure attitude toward the specific behavior being advocated in the advertisement: “To what degree do you personally support the goals of the advocacy organization sponsoring the ad?” (response options comprised a 7-point scale ranging from “do not support” to “strongly support”) and “To what degree do you personally agree with the goals of the advocacy organization sponsoring the ad?” (response options comprised a 7-point scale ranging from “do not agree” to “strongly agree”).
Behavioral intentions were assessed with a series of five items designed to represent increasing levels of personal sacrifice. Response options for each of these five items comprised a 7-point Likert-type scale ranging from “not likely” to “likely.” The specific five behavioral intentions asked about were searching for more information, signing a petition, writing an email to a public official, donating money and donating personal time.

The survey then included questions to check the manipulations included in the stimulus materials. The manipulation check for issue type was a single item asking “What type of issue did the ad address?” with a 7-point response option anchored by “local” and “global.” The manipulation check for efficacy was made up of three items designed to measure perceived levels of efficacy toward the specific issue address in the advocacy advertisement. These questions were of course different in the local and global conditions. For each of these items, response options comprised 7-point Likert-type sales ranging from “strongly disagree” to “strongly agree.” In the local conditions, the items were “Photochemical smog in Happy Valley is preventable,” “Enforcement of stricter local emissions standards can prevent photochemical smog in Happy Valley,” and “Photochemical smog in Happy Valley will be difficult to prevent” (reversed item). In the global condition the items were identical but referred to “global warming” rather than “photochemical smog in Happy Valley.”

Finally, participants were asked to characterize the responses they provided in terms of perceived construal level. Past research has successfully used self reports to determine the nature of participant construal, in particular with regard to pragmatic versus idealistic construals. The items developed for this study were based on items developed by Kivetz and
Tyler (2007). More distal psychological objects were found to elicit more idealistic construals, as measured by a set of nine items answered on a 7-point Likert-type scale ranging from “strongly disagree” to “strongly agree” (the order of these items was randomized by MediaLab to avoid order effects).

1. My support for this advocacy organization places values and principles above all other considerations.
2. My support for this advocacy organization stands up for my beliefs.
3. My support for this advocacy organization expresses my true self.
4. My support for this advocacy organization contributes to the community.
5. My support for this advocacy organization is self-fulfilling.
6. My support for this advocacy organization takes advantage of an opportunity given the situation.
7. My support for this advocacy organization is money oriented.
8. My support for this advocacy organization maximizes my self-interest.
9. My support for this advocacy organization is action oriented.

Items 1 through 5 represent idealistic orientations; items 6 through 9 represent pragmatic orientations.

**Survey Administration**

When students arrived at the Media Effects Research Lab, they were invited to sign in on a separate laptop computer to ensure they would receive their extra credit. A custom designed Microsoft Access form was designed for this purpose, whereby students could select the class for extra credit from a drop-down list and enter their user ID. They then read and signed an informed consent form and chose a workstation on which to complete the survey. The first page of survey instructions appeared on the screen. These instructions included information on how to skip a question (Ctl+right arrow). Participants then proceeded to take the survey.
Groups of 10 students were scheduled every half hour, and most participants completed the experiment in less than 20 minutes.

Survey data was saved to a separate file on each workstation. Each data file was backed up onto an external USB drive each day the experiment was run (in the event something happened to one of the workstations in between data-gathering sessions). At the end of the two-week data-gathering period, the data files were saved for a final time and combined into a single data file. Because each auto-start file was programmed with a unique set of case ID numbers, this final data file included information on how many people took the survey on each workstation, and on what day.

**Data Analysis Techniques**

The data generated by this experiment was designed to be analyzed using a number of standard social scientific statistical techniques, primarily ordinary least squares (OLS) regression, ANOVA, MANOVA and path analysis. These techniques are all special cases of the general linear model (GLM); within this model tests can also be performed to examine interactions among and mediation between variables.

Prior to analysis, all variables (and computed scales derived from them) were examined for data-entry accuracy, missing data and fit between their distribution and the assumptions of multivariate analysis. In terms of univariate normality, statistics for skewness and Kurtosis were analyzed, along with histograms with normal fitted lines. Transformations were performed as possible and necessary to improve normality. In terms of multivariate normality, Mahalanobis
distance was used to check for multivariate outliers and residual plots were examined for multivariate non-normality, non-linearity or heteroscedasticity.

Reliability of computed scales were analyzed using Cronbach’s alpha, the most widely used measure of scale consistency. The measure takes on a value between 0 and 1 with higher values indicating higher reliability. The generally agreed on lower limit for Cronbach’s alpha is .70, although .60 is acceptable in exploratory research (Hair, Anderson, Tatham, & Black, 1998). Because Cronbach’s alpha is sensitive to the number of items in a scale, more sensitive measures should be used for scales with a large number of items, and scales with a small number of items will tend to have a lower alpha reliability (Hair et al., 1998).

Interrelationships among variables were also be analyzed using factor analysis, in order to explore underlying dimensions in the data that would allow for reduction in the number of specific variables being studies with a minimum loss of information (Hair et al., 1998). Exploratory factor analysis is used when the researcher wants to determine how many latent constructs are represented within a set of related, observed variables. Confirmatory factor analysis, on the other hand is a general modeling approach designed to test hypotheses about factor structure (Raykov & Marcoulides, 2006). Factor analysis is sensitive to multivariate normality of the variables being studied. Missing data must be dealt with prior to analysis. Sample size of 200 is generally considered acceptable for exploratory purposes, but 300 or more participants are required for reliable results (Tabachnick & Fidell, 2007). For this reason, only exploratory factor analysis will be used in this study.
Multiple regression is used when a single, continuous dependent variable is predicted by one or more independent variables, and is therefore the appropriate statistical test for much of the data analysis proposed in this study. The objective of multiple regression is to predict changes in a dependant variable in response to changes in the independent variables. This is achieved through the statistical rule of least squares (thus ordinary least squares, or OLS, regression) (Hair et al., 1998). Multicollinearity and singularity are problems that can occur with multiple regression when variables are too highly correlated. With multicollinearity variables are highly correlated (.90 or higher), while with singularity variables are redundant (one variable is a combination of other variables, and therefore provides no new information in the equation). Correlations among the main independent variables in the study can be compared using a correlation matrix. Most statistical programs protect against singularity by setting tolerances for the square multiple correlation of each variable (were each independent variable in turn serves as the dependent variable and the others independent variables) (Tabachnick & Fidell, 2007).

Another issue with multiple regression is the ratio of cases to independent variables. One simple rule of thumb for the testing of individual predictors, as this study seeks to do, is $N<104+m$, where $m$ is the number of predictor variables. Because the planned analysis is for only a small number of independent variables to be included at the same time (with random assignment equality of other independent variables can be assumed), a sample size over 110 is required and the sample used in the study is more than adequate.
Multiple regression is also useful to test for interactions between and among variables (while ANOVA/MANOVA can be use for categorical variable interactions, regression can be used to test for interactions that involve continuous variables as well). Comparing interactions between two variables is relatively simple. An interaction term is computed and entered into the equation, along with the native terms that comprise it. If the coefficient for the interaction term is significant, it means that dependent variable X is predicted by independent variable Y, but the effect differs across the range of moderator variable Z. The constant and coefficients from the resulting regression can be used to plot such interactions (between categorical variables, between continuous variables or between a categorical and continuous variable).

Interpretation of two-way interactions is relatively straight forward. However, plotting and interpreting three-way interactions is quite a bit more complicated. All three interactions terms, as well as the three-way interaction term are included in the regression along with the native terms that comprise them. If the coefficient of the three-way interaction is significant, it means the dependent variable X is predicted by independent variable Y, but the effect differs across the range of moderator variable Z, and/or moderator variable W and/or the combination of Z and W. Gaining insight into which of the variables is most responsible for the interaction requires additional interpretation. One approach to plotting a three-way interaction is to use two sets of two lines to represent two variables, with the third variable on the X axis, using values one standard deviation above and below the mean as “pick-a-point” values for continuous variables (Dawson & Richter, 2006). Differences in slopes among the variables help to interpret the interaction, and statistical tests have been developed to ascertain which slope differences are statistically significantly different (Dawson & Richter, 2006).
Multiple regression is also useful in testing for mediation between and among variables. The most common approach is the causal steps strategy (Baron & Kenny, 1986). Other approaches focus on the product of the regression coefficients from the independent-mediator-dependent variable causal chain, and the ratio of this product to its standard error (with an assumed normal distribution) (Sobel, 1982). Methodologists have taken issue with the assumption of normality of standard error in such tests, and Preacher et al. (2007) advocate the bootstrapping technique for creation of confidence intervals in mediation analysis (the authors have also developed an SPSS macro that tests for single or multiple mediation using this approach). Unlike ordinary confidence intervals (CIs), percentile bootstrapping can be asymmetrical because they are based on empirical estimation of the sampling distribution rather than the assumption that the distribution is normal. In addition, percentile bootstrap CIs can be improved with bias-corrected (BC) and bias-corrected and accelerated (BCa) intervals (Efron & Tibshirani, 1998).

Because participants will be randomly assigned to treatment conditions, a number of research questions will revolve around differences among groups, in particular how differences in dependent variables are associated with group membership. Factorial ANOVA/ANCOVA and factorial MANOVA/MANCOVA will be appropriate tests for these group differences, depending on the number of dependent variables being addressed in the analysis. In addition to the data meeting the assumptions of multivariate analysis discussed above (normality, linearity, outliers, missing data, multicollinearity and singularity), these techniques are sensitive to unequal cell sizes (Tabachnick & Fidell, 2007). A general rule of thumb is that the ratio of the smallest to the largest cell is no greater than 4 to 1 and that the error degrees of freedom is at least 20. Both
these assumptions will be met in this study. In the case of ANCOVA and MANCOVA, homogeneity of variance and homogeneity of regression are also assumed. That is, the variance of the covariant is assumed to be equal across groups, and the relationship between the covariant and the dependent variable is the same across groups.

Finally, as multiple causal relationships are hypothesized, path analysis will be used to create and test an overall model. Path analysis is a special type of structural equation modeling (SEM). SEM is a technique for testing models or hypothesized relationships between latent and observed variables. Path analysis tests the linear relationship between observed variables only (no latent constructs are included in path models), taking into consideration the error in measurement of the variables.

Path analysis model fit indicators test how well a proposed model fits the data. According to Raykov and Marcoulides (2006), criteria for a good model fit can be summarized as follows: a non-significant Chi-Square and a ratio of Chi-square to degrees of freedom of equal to or less than 3; a comparative fit analysis (CFI) greater than or equal to .90; a goodness of fit index (GFI) score of greater than or equal to .90; a normed fit index (NFI) score of greater than or equal to .90; and, root mean squared error approximation (RMSEA) of less than or equal to .05.

Chi-square is an inferential statistic that in essence acts as the null hypothesis in path modeling. The desired Chi-square test for a given model is non-significance, indicating that the null hypothesis (the model fits the data) cannot be rejected. A low ratio of Chi-square to degrees of freedom is also desirable. Two additional tests that measure the degree to which the
data fit the model are goodness of fit index (GFI) and normed fit index (NFI). GFI measures the degree to which a model explains the variance and covariance in the data. Scores for GFI range from 0 (no fit) to 1 (perfect fit). The normed fit index (NFI) tests the fit of the data to the independence model (model with no relationships) versus the saturated model (the proposed model). Two other fit indices look at alternative fit models: comparative fit index (CFI) and root mean square error approximation (RMSEA). CFI is measures the improvement in fit of the proposed model over a model with no relationship. Root mean square error approximation (RMSEA) takes into consideration the complexity of the model and scores indicate if the model does not fit the data (Raykov & Marcoulides, 2006).
Results

To begin the analysis of results, the dataset was cleaned up and checked for missing data. Items measuring a single variable were checked for reliability, and, when appropriate, combined into a new variable. Variables were checked for outliers and univariate normality. Scales measuring constructs that may contain more than one dimension were factor analyzed.

Because all data was gathered using MediaLab, there was no possibility for data entry error. However, the data files produced by the program had to be combined and reformatted to some extent. Data files sorted by questionnaire were combined into a single SPSS file, with 227 cases and more than 100 variables. MediaLab creates a variable for the name of the questionnaire (each experiment can comprise several questionnaires) and for each instruction screen, as well as for all numeric participant question responses.

All reverse coded items were re-coded so that higher values indicate more of the concept being measured (for example, the manipulation check for perceived efficacy where the objective is seen as “difficult” was re-coded from “effdiff” to “effdiffrecode.”). One benefit of the software was a minimization of missing data. Three participants left the income field blank and one other participant left the political party ID and political conservatism variables blank. These variables are not used in the study at hand, and there was no other missing data in the entire survey.

Variables were computed for distance condition and efficacy condition using SPSS “DO IF/ELSE” syntax:
DO IF (Cond EQ 1 or Cond EQ 2).
  COMPUTE Distance=0.
ELSE.
  COMPUTE Distance=1.
END IF.

DO IF (Cond EQ 1 or Cond EQ 3).
  COMPUTE Efficacy=1.
ELSE.
  COMPUTE Efficacy=0.
END IF.

This created a Distance variable with a value of 0 for the local conditions and 1 for global conditions and an Efficacy variable with a value of 0 for the low efficacy conditions and 1 for the high efficacy conditions.

Further variable computation was needed for the manipulation check questions. Because these questions were checking for differences in reactions to different issues (global versus local), different questionnaires were used in the local and global conditions. The MediaLab data output, therefore, included separate variables for local and global variables (participants in local conditions were coded as missing—“99” in MediaLab data files—for the global variables, and vice versa). These variables had to be combined so that all the data was in one variable. This was also accomplished using the SPSS “DO IF/ELSE” function:

DO IF (checkgl EQ 99).
  COMPUTE combcheckgl=checkgl_A.
ELSE.
  COMPUTE combcheckgl=checkgl.
END IF.
DO IF (effprev EQ 99).
  COMPUTE combeffprev=effprev_A.
ELSE.
  COMPUTE combeffprev=effprev.
END IF.
DO IF (effstrict EQ 99).
  COMPUTE combeffstrict=effstrict_A.
ELSE.
  COMPUTE combeffstrict=effstrict.
END IF.
DO IF (effdiffrecode EQ 99).
  COMPUTE combeffdiffrecode=effdiffrecode.
ELSE.
  COMPUTE combeffdiffrecode=effdiffrecode.
END IF.

Because the variable names from the local and global manipulation check questionnaires were the same (“checkgl” for the distance manipulation check and “effprev,” “effstrict” and “effdiffrecode” for the perceived efficacy manipulation check), MediaLab added
“_A” to the second (local) set of variable names. As this syntax indicates, if there was missing data (“99”) in the global questionnaire, the data from local questionnaire was used, else the global data is used, in creating a new combined variables (“combcheckgl,” “combeffprev,” “combeffstrict” and “combeffdiffrecode”).

Reliability and Factor Structure of Measures

With data housekeeping complete, analysis of variables could begin. Demographic information and political orientation variables were included as possible independent variables. The gender, ethnicity and year-in-school variables were summarized in the Sample section (above). A plurality (30.4%) of participants indicated an estimated family income of $100K to $150K. This variable was acceptably normal (skewness and Kurtosis less than |1|) and could be treated as continuous in any future analysis.

In terms of political identity, the sample exhibited the usual bi-modal distribution, with a tilt to the left. One participant declined to answer this question, for a total of 226. Sixteen participants regarded themselves as strong Democrats, 54 moderate Democrats, 61 independent-minded Democrats, 33 Independents, 21 independent-minded Republicans, 34 moderate Republicans and 7 strong Republicans. All 227 participants answered the question about party registration, and 112 reported being registered Democrat, 52 Republican, 24 Independent, 1 other and 38 not registered. Of the 227 participants, 128 indicated they are planning to vote for the Democratic candidate, 34 for the Republican candidate, 1 for the Independent candidate, 2 for other and 62 undecided (at the time of the experiment, John McCain had emerged as the probable Republican candidate; the contest between Barack
Obama and Hillary Clinton continued). In terms of self-reported political conservatism, the sample was skewed somewhat to the left (the same participant who declined to provide their political identity declined to answer this question). Seven participants described themselves as extremely liberal, 64 as liberal 39 as slightly liberal, 62 as moderate or middle of the road, 32 as slightly conservative, 21 as conservative and 1 as extremely conservative.

These variables of political identity and ideology may be of use in future research with this dataset. In terms of the present study, they were included primarily as a control (to ensure the sample is not radically left or right of center) and to check the congruent validity of other measures. Need for cognition was also measured as a possible control variable, and reliability for this scale was .88.

The two main measures of environmental values—NEP and EC—were analyzed first. Both these scales are designed to capture multidimensional constructs. The NEP scale, though typically used as a single measure, is theoretically built around five sub-scales, each measured by three items: balance, eco-crisis, anti-exemptionalism, limits and anti-anthropomorphism (see Assessing Environmental Values, above). Due to the nature of the scale, it can be assessed by looking at the overall reliability of the 15 items, as well as by exploratory factor analysis.

The Cronbach’s alpha for all 15 items was .79. The reliability could be improved with the removal of the item stating that the earth has plenty of resources if we learn how to develop them, increasing the reliability slightly. This result could be an artifact of this being one of five reverse-coded items in the NEP. Though the sample size is relatively small for factor analysis, it was used for exploratory purposes. Consistent with prior research, principal components factor
analysis did not yield the five sub-concepts inherent in the scale design (Dunlap et al., 2000a). These results indicate that for the purposes of this study, the 15 items in the NEP reliably assessed a single concept of environmental values.

The EC scale was designed specifically to capture egoistic (me, my health, my lifestyle, my future), altruistic (all people, children, my children, people in my country) and biospheric (plants, marine life, animals, birds) concerns. Although several studies have found support for the three-factor model, other research has found that the egoistic and altruistic items load on one factor, resulting in a two-factor structure. Based on results from this study, the four egoistic concern items showed reliability of .86, and removal of none of the items would improve reliability. The four altruistic items had Cronbach’s alpha of .94, and removal of none of the items would improve reliability. Reliability of the four biospheric items was .88, again with removal of none of the items improving the result. A principal-components factor analysis with Varimax rotation was used to test the factor structure of the 12 items (see Table 3). This analysis indicated the presence of two dimensions accounting for 66.59% of the total variance of the items. These dimensions supported the two-factor structure described above.
Table 3
Factor loadings of EC scale items using principal-components factor analysis with Varimax rotation

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 (egoistic/altruistic)</th>
<th>Factor 2 (biospheric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me</td>
<td>.878</td>
<td>120</td>
</tr>
<tr>
<td>My health</td>
<td>.750</td>
<td>.377</td>
</tr>
<tr>
<td>My lifestyle</td>
<td>.740</td>
<td>.009</td>
</tr>
<tr>
<td>People in my country</td>
<td>.727</td>
<td>.274</td>
</tr>
<tr>
<td>My future</td>
<td>.722</td>
<td>.404</td>
</tr>
<tr>
<td>Children</td>
<td>.712</td>
<td>.363</td>
</tr>
<tr>
<td>All people</td>
<td>.642</td>
<td>.523</td>
</tr>
<tr>
<td>Future generations</td>
<td>.531</td>
<td>.346</td>
</tr>
<tr>
<td>Birds</td>
<td>.149</td>
<td>.868</td>
</tr>
<tr>
<td>Marine life</td>
<td>.195</td>
<td>.853</td>
</tr>
<tr>
<td>Animals</td>
<td>.284</td>
<td>.839</td>
</tr>
<tr>
<td>Plants</td>
<td>.313</td>
<td>.717</td>
</tr>
</tbody>
</table>

Note: All responses were on a 7-pointy scale ranging from “not important” to “very important” and the sample size was 227

Using the 60/40 rule (whereby an item must load at .60 or higher on a factor and .40 or lower on all other factors), the results show that all but three (my future, all people, future generations) of the egoistic/altruistic items load on the first factor and all of the biospheric items load on the second factor. This result strongly supports the notion of a two-factor structure of egoistic/altruistic and biospheric concern, with the second factor particularly
strong. Averaged composite variables were created for each factor, the first (ECselfother) based on eight items and the second (ECnature) based on four.

Consumerism (materialism) was also measured and the five items in the scale exhibited reliability of .73. This result could be slightly improved with exclusion of the one reverse coded item, but this is most likely an artifact of the survey design and the item was included in an averaged composite variable labeled “Consumerism.”

This variable can be used, along with NEP and political conservatism, to check the congruent validity of the ECnature variable. ECnature should be significantly positively correlated with NEP and significantly negatively correlated with Consumerism and Conservatism. Pearson correlation indicates this precise result. ECnature is positively correlated with NEP, $r(225)=.455$, $p<.001$, and negatively correlated with Consumerism, $r(225)=-.160$, $p<.05$, and conservatism, $r(224)=-.248$, $p<.001$. Because this study is examining the role of values, the ECnature scale seems to represent the best measure from a theoretical standpoint. It does not mention environmental issues directly, but taps into how an individual sees themselves in relation to nature. ECnature is used as the primary measure of environmental values in the ensuing analysis.

Respondents were asked how knowledgeable, supportive and involved they were with environmental causes prior to the experiment. The two items related to self-reported knowledge (knowledgeable and familiar) were reliable at .87 and the two items related to involvement (involved and supportive) were reliable at .77. Average composite variables were created for each.
A number of other standard communications variables were measured for use as possible independent and/or dependent variables in the analysis. The scale designed to measure ad involvement, or self-reported processing level, was reliable at .919. The five items related to negative affect or fear were reliable at .94. The four items measuring ad credibility were reliable at .86. Attitude toward the ad (Aad) was measured along the dimensions of cognitive, liking and perceived persuasion. Aad cognitive had Cronbach’s alpha of .89. Aad liking .93 and Aad perceived persuasion .95. Averaged composite variables were computed for each of these scale. Because all scales were based on 5- or 7-point response options, there was low likelihood of univariate outliers. All these scales were acceptably normal in terms of their distribution with skewness and Kurtosis less than |1|.

Self-reported construal level is an important variable in the current study, and was measured with a scale of nine items developed by the researcher, based on prior research. Each of these items started with the phrase “My support for this advocacy organization...” These nine items were intended to capture two dimensions of construal: idealistic and pragmatic, with the former representing a higher level of construal. Five items were intended to reflect idealistic construals and four items were intended to reflect pragmatic construals. The reliability of the five idealistic items was .87, while the reliability of the pragmatic items was significantly lower at .66. The reliability of the pragmatic construal scale could be improved significantly, to .74, by removing the item “...is money oriented.”

A principal-components factor analysis with Varimax rotation was used to test the factor structure of the 9 items (see Table 4). This analysis indicated the presence of two dimensions
accounting for 65.26% of the total variance of the items. Although this result supports the basic concept of a two-factor structure, only one item, “… is money oriented,” loaded on the second factor. All the other items loaded relatively strongly on the first idealistic construal factor.

Because of the relatively small size of the sample for use in factor analysis, not too much can be made of this result. In terms of environmental issues, it can be argued that “…maximizes my self interest,” “…takes advantage of an opportunity given the situation” and “…is action oriented” do not run counter to idealistic construal. Because environmental issues are communal, supporting them does benefit an individual, and in that sense is in their self interest. And certainly taking advantage of a situation and being action oriented can be seen as idealistic in the context of the environment.
Table 4
Factor loadings of idealistic/pragmatic construal scale items using principal-components factor analysis with Varimax rotation

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 (idealistic)</th>
<th>Factor 2 (pragmatic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>...stands up for my beliefs</td>
<td>.864</td>
<td>.015</td>
</tr>
<tr>
<td>...expresses my true self</td>
<td>.808</td>
<td>.114</td>
</tr>
<tr>
<td>...is self-fulfilling</td>
<td>.793</td>
<td>.038</td>
</tr>
<tr>
<td>...maximizes my self interest</td>
<td>.766</td>
<td>.253</td>
</tr>
<tr>
<td>...takes advantage of an opportunity given the situation</td>
<td>.763</td>
<td>.163</td>
</tr>
<tr>
<td>...contributes to the community</td>
<td>.740</td>
<td>-.118</td>
</tr>
<tr>
<td>...places values and principles above all other considerations</td>
<td>.738</td>
<td>.150</td>
</tr>
<tr>
<td>...is action oriented</td>
<td>.696</td>
<td>.041</td>
</tr>
<tr>
<td>...is money oriented</td>
<td>.074</td>
<td>.975</td>
</tr>
</tbody>
</table>

Note: Each item begins with the phrase “My support for this advocacy organization...” All responses were on a 7-pointy scale ranging from “strongly disagree” to “strongly agree” and the sample size was 227

Including all eight of the items that loaded on the idealistic construal factor in a reliability analysis results in a Cronbach’s alpha of .91, only marginally better than the five-item scale. The high reliability of the five- and eight-item scales and the overall factor structure of the construal questions provide strong evidence that the items are indeed measuring the concept of idealistic construal. And because the five- and eight-item variables are very highly correlated, r(225)=.976, p<.001, the five-item averaged composite variable will be used in for analysis in the interest of parsimony, and for theoretical reasons.
The primary dependent variables comprised attitude toward the behavior (two items) and behavioral intentions (four items). Reliability of the attitude toward the behavior (support and agreement is the advocacy organization’s goals) was .89; behavioral intention (search for more information, sign a petition, send an email, donate money, donate time) was .88. Averaged composite variables were computed for both these scales, and both were acceptable normal, with skewness and Kurtosis less than |1|.

A total of four items were included to check the effectiveness of the manipulations of distance and efficacy. The distance manipulation check was a single item that was designed to be non-normal. Perceived efficacy was measured with three items, one of which was reverse coded. The reliability of all three items was low—.43 However, removal of the reverse coded item improved reliability to .60. This level of reliability just achieves the minimum level required for exploratory research. Measuring perceived efficacy relative to environmental issues has proven difficult, and the results from this study are commensurate with levels of reliability achieved in other recent research (Kellstedt et al., 2008).

**Manipulation Checks**

The manipulation check for issue distance consisted of a single item: “What type of issue would you say was addressed in the ad?” The response options ranged from 1 for “Local Issue” to 7 for “Global Issue.” As expected, an independent sample t-test showed that participants in the global conditions viewed the issued addressed as more global ($M=6.4$, $SD=1.0$) than participants in the local conditions ($M=2.1$, $SD=1.6$), $t(225)=-24.1$, $p<.001$. 

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The efficacy manipulation was checked using the two-item perceived efficacy variable described above. In an important finding of non-significance, participants in high and low efficacy conditions reported the same general level of perceived efficacy. An independent sample t-test showed that there was not statistically significant difference in perceived efficacy between participants in the high efficacy conditions ($M=5.1$, $SD=1.2$) and participants in the low efficacy conditions ($M=4.9$, $SD=1.1$). Perceived efficacy proved impossible to manipulate on this issue.

However, because of the 2x2 design, not everyone in the low efficacy conditions received the same message. Some were presented with a local issue and some were presented with a global issue. The same, of course, was true in the high efficacy conditions. Perhaps the distance manipulation was impacting perceived efficacy?

To explore this possibility, efficacy was treated as the dependent variable in a distance x efficacy factorial ANOVA. A significant main effect was found for distance, $F(223)=5.79, p<.05$, such that participants in the global conditions had higher levels of perceived efficacy ($M=5.18$, $SD=1.1$) than participants in the local conditions ($M=4.8$, $SD=1.1$). This effect was particularly strong for participants in the high efficacy condition, such that participants in condition 1 (local/high efficacy) had significantly lower levels of perceived efficacy ($M=4.9$, $SD=1.1$) than participants in condition 3 (global/high efficacy) ($M=5.35$, $SD=1.2$), although the distance-by-efficacy interaction did not reach the level of statistical significance. This result indicates that perceived efficacy is to some extent a function of issue distance. This notion is highly relevant
to communications professionals, and will be a relationship that is studied in more detail in the ensuring data analysis and interpretation of results.

**Main Hypotheses**

H1 predicted that environmental values (EV, using the averaged composite measure ECnature) would be a significantly more powerful predictor of attitude toward the behavior (AB) and behavioral intentions (BI) in global conditions compared to local conditions. This hypothesis was tested with a series of regression analyses. For all regressions run during data analysis, Mahalanobis was used to check for multivariate outliers and residual plots were examined for multivariate non-normality, non-linearity or heteroscedasticity. Although a small number of possible multivariate outliers were identified, removal of these cases did not change any of the results.

First, AB was regressed on EV in the global groups and local groups separately, to see if there was indeed any difference. In the global conditions, EV significantly predicted AB, $\beta=.35$, $t(109)=3.98$, $p<.001$, and explained a significant portion of the variance in AB, $R^2=.13$, $F(110)=15.81$, $p<.001$. In the local conditions, EV also significantly predicted AB, $\beta=.29$, $t(112)=3.19$, $p<.01$, and explained a significant portion of the variance in AB, $R^2=.08$, $F(113)=10.15$, $p<.01$. Based on the size of the standardized coefficients for EV and the size of $R^2$, it can be seen that EV does appear to be a stronger predictor of AB in the global conditions. Additional analysis will be required to test if these differences are significant.

This same general procedure was repeated for BI. In the global conditions, EV significantly predicted BI, $\beta=.50$, $t(109)=6.13$, $p<.001$, and explained a significant portion of the
variance in BI, $R^2 = .25$, $F(110)=37.55$, $p<.001$. In the local conditions, EV also significantly predicted BI, $\beta = .46$, $t(112)=5.54$, $p<.001$, and explained a significant portion of the variance in BI, $R^2 = .21$, $F(113)=30.64$, $p<.001$. Again, the standardized coefficients for EV and the size of $R^2$ indicate that EV is a slightly stronger predictor of BI in the global conditions, but this difference may not be statistically significant.

To test if the differences in the predictive power of EV in the global and local conditions are statistically significant, AB was regressed on EV with distance (D) and the EV x D interaction term added to the equation. Because D is coded 0 for local and 1 for global, the coefficient for the interaction term will reflect the difference in the relationship of EV to AB between the global condition and the omitted group (local condition). BI was also regressed on EV with D and the interaction term included in the model. The coefficient of the interaction term was not significant in either of these tests. These tests did not support H1.

H2 predicted that Perceived efficacy (PE) would be a significantly more powerful predictor of attitude toward the behavior (AB) and behavioral intentions (BI) in local conditions compared to global conditions. This hypothesis was tested with a similar series of regression analyses.

AB was regressed on perceived efficacy (PE) in the global groups and local groups separately. In the global conditions, PE significantly predicted AB, $\beta = .31$, $t(109)=3.42$, $p<.001$, and explained a significant portion of the variance in AB, $R^2 = .10$, $F(110)=11.69$, $p<.001$. In the local conditions, PE also significantly predicted AB, $\beta = .45$, $t(112)=5.28$, $p<.001$, and explained a significant portion of the variance in AB, $R^2 = .20$, $F(113)=27.91$, $p<.001$.  

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This same general procedure was repeated for BI. In the global conditions, PE significantly predicted BI, $\beta=.21$, $t(109)=2.29$, $p<.05$, and explained a significant portion of the variance in BI, $R^2=.05$, $F(110)=4.26$, $p<.05$. In the local conditions, PE significantly predicted BI, $\beta=.30$, $t(109)=3.37$, $p<.001$, and explained a significant portion of the variance in BI, $R^2=.09$, $F(110)=11.37$, $p<.001$.

Based on the size of the standardized coefficients for PE and the size of $R^2$, PE does appear to be a stronger predictor of AB in the local conditions. However, additional tests show this difference is not significant. AB and BI were regressed on PE with D and the PE x D interaction term added to the equation. The coefficient of the interaction term was not significant in either of these tests. These tests did not support H2. The basic hypothesized interaction is illustrated in Chart 1. Although the PE appears to be a stronger predictor of AB in local conditions (the slope of the line is steeper), this difference does not reach statistical significance.

Chart 1

**Relationship of Perceived Efficacy to Attitude Toward Behavior (AB) For Local and Global Issues**
Despite the overall lack of support for these hypotheses, as with perceived efficacy, the nature of the design and interactions between distance and efficacy manipulations within groups may have had an effect on outcomes. That is, not all people in the global conditions received the same message. Some were in low efficacy conditions and some were in high efficacy conditions. The same is true for the local conditions. Therefore, a similar analysis was conducted by individual condition. For H1, two sets of four multiple regressions were conducted: the first set comparing the effect of EV on AB in each condition and the second set comparing the effects of EV on BI in each condition. Two similar sets of four tests were conducted for H2. To conduct this analysis, dummy codes were created for the four conditions and one condition was omitted in each set of tests. The equations for these tests are presented in Tables 5 and 6, with $C_j$ indicating the dummy code for that condition and $e$ indicating error.

### Table 5
Equations for individual condition analysis of H1

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>Regression Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$AB = b_{EV}EV + b_2C_2 + b_3C_3 + b_4C_4 + b_{EV2}C_2EV + b_{EV3}C_3EV + b_{EV4}C_4EV + e$</td>
</tr>
<tr>
<td>2</td>
<td>$AB = b_{EV}EV + b_1C_1 + b_3C_3 + b_4C_4 + b_{EV1}C_1EV + b_{EV3}C_3EV + b_{EV4}C_4EV + e$</td>
</tr>
<tr>
<td>3</td>
<td>$AB = b_{EV}EV + b_1C_1 + b_2C_2 + b_4C_4 + b_{EV1}C_1EV + b_{EV2}C_2EV + b_{EV4}C_4EV + e$</td>
</tr>
<tr>
<td>4</td>
<td>$AB = b_{EV}EV + b_1C_1 + b_2C_2 + b_3C_3 + b_{EV1}C_1EV + b_{EV2}C_2EV + b_{EV3}C_3EV + e$</td>
</tr>
<tr>
<td>1</td>
<td>$BI = b_{EV}EV + b_1C_1 + b_2C_2 + b_3C_3 + b_{EV1}C_1EV + b_{EV2}C_2EV + b_{EV3}C_3EV + b_{EV4}C_4EV + e$</td>
</tr>
<tr>
<td>2</td>
<td>$BI = b_{EV}EV + b_1C_1 + b_3C_3 + b_4C_4 + b_{EV1}C_1EV + b_{EV3}C_3EV + b_{EV4}C_4EV + e$</td>
</tr>
<tr>
<td>3</td>
<td>$BI = b_{EV}EV + b_1C_1 + b_2C_2 + b_4C_4 + b_{EV1}C_1EV + b_{EV2}C_2EV + b_{EV4}C_4EV + e$</td>
</tr>
<tr>
<td>4</td>
<td>$BI = b_{EV}EV + b_1C_1 + b_2C_2 + b_3C_3 + b_{EV1}C_1EV + b_{EV2}C_2EV + b_{EV3}C_3EV + e$</td>
</tr>
</tbody>
</table>
### Table 6
Equations for individual condition analysis of H2

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>Regression Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$AB = b_{PE}PE + b_2C_2 + b_3C_3 + b_4C_4 + b_{PE2}C_2PE + b_{PE3}C_3PE + b_{PE4}C_4PE + e$</td>
</tr>
<tr>
<td>2</td>
<td>$AB = b_{PE}PE + b_1C_1 + b_3C_3 + b_4C_4 + b_{PE1}C_1PE + b_{PE3}C_3PE + b_{PE4}C_4PE + e$</td>
</tr>
<tr>
<td>3</td>
<td>$AB = b_{PE}PE + b_1C_1 + b_2C_2 + b_4C_4 + b_{PE1}C_1PE + b_{PE2}C_2PE + b_{PE4}C_4PE + e$</td>
</tr>
<tr>
<td>4</td>
<td>$AB = b_{PE}PE + b_1C_1 + b_2C_2 + b_3C_3 + b_4C_4 + b_{PE1}C_1PE + b_{PE2}C_2PE + b_{PE3}C_3PE + e$</td>
</tr>
<tr>
<td>1</td>
<td>$BI = b_{PE}PE + b_2C_2 + b_3C_3 + b_4C_4 + b_{PE2}C_2PE + b_{PE3}C_3PE + b_{PE4}C_4PE + e$</td>
</tr>
<tr>
<td>2</td>
<td>$BI = b_{PE}PE + b_1C_1 + b_3C_3 + b_4C_4 + b_{PE1}C_1PE + b_{PE3}C_3PE + b_{PE4}C_4PE + e$</td>
</tr>
<tr>
<td>3</td>
<td>$BI = b_{PE}PE + b_1C_1 + b_2C_2 + b_3C_3 + b_{PE1}C_1PE + b_{PE2}C_2PE + b_{PE3}C_3PE + e$</td>
</tr>
<tr>
<td>4</td>
<td>$BI = b_{PE}PE + b_1C_1 + b_2C_2 + b_3C_3 + b_{PE1}C_1PE + b_{PE2}C_2PE + b_{PE3}C_3PE + e$</td>
</tr>
</tbody>
</table>

For each test, the coefficient of EV or PE indicates the significance of the slope of the line for the omitted group, and the coefficients for the three condition terms indicates if the slope of the line for that group is significantly different from the slope of the line for the omitted group. Therefore, a total of 10 $p$ values will be analyzed for significance for each set of tests. Because this analysis is exploratory in nature, all significant $p$ values will be identified. However, those values that are still significant after applying a Holm’s sequential Bonferroni post hoc analysis, to protect Type I error, will also be indicated. Results are shown in Tables 7 through 10.
Table 7
Relationship of EV to AB across four treatment conditions, unstandardized regression coefficients and (standard errors)

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.222</td>
<td>(155)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.280</td>
<td>.502**†</td>
<td>.158</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.366</td>
<td>.086</td>
<td>.588***†</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.047</td>
<td>-.233</td>
<td>-.319</td>
<td>.269</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01, *** p<.001, † significant after applying Holm’s sequential Bonferroni post hoc test at p<.05 for group of 10 comparisons

This analysis indicates that EV is a significant predictor of AB in conditions 2 and 3, and that the relationship of EV to AB is not significantly different between any of the groups.
Table 8
Relationship of EV to BI across four treatment conditions, unstandardized regression coefficients and (standard errors)

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.651***†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.147)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-.024</td>
<td>.627***†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.224)</td>
<td>(.160)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.314</td>
<td>.338</td>
<td>.965***†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.238)</td>
<td>(.240)</td>
<td>(.179)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-.104</td>
<td>-.080</td>
<td>-.418</td>
<td>.547***†</td>
</tr>
<tr>
<td></td>
<td>(.210)</td>
<td>(.212)</td>
<td>(.227)</td>
<td>(.140)</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01, *** p<.001, † significant after applying Holm’s sequential Bonferroni post hoc test at p<.05 for group of 10 comparisons

Table 8 shows that EV is a significant predictor of BI in all four conditions, but none of the groups is significantly different from another. The results from Tables 7 and 8 do not support H1, which predicted EV would be a stronger predictor of AB in conditions 3 and 4.
Table 9
Relationship of PE to AB across four treatment conditions, unstandardized regression coefficients and (standard errors)

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.416**†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.145)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.300</td>
<td>.716***†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.205)</td>
<td>(.145)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.211</td>
<td>-.089</td>
<td>.627***†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.203)</td>
<td>(.202)</td>
<td>(.142)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-.419</td>
<td>-.719***†</td>
<td>-.630**†</td>
<td>-.004</td>
</tr>
<tr>
<td></td>
<td>(.214)</td>
<td>(.213)</td>
<td>(.211)</td>
<td>(.157)</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01, *** p<.001, † significant after applying Holm’s sequential Bonferroni post hoc test at p<.05 for group of 10 comparisons

Table 9 shows that PE is a significant predictor of AB in both local conditions, and was only a predictor of AB in the high efficacy global condition. In addition, conditions 2 and 3 have significantly different slopes from condition 4.
Table 10
Relationship of PE to BI across four treatment conditions, unstandardized regression coefficients and (standard errors)

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.268</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.169)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.262</td>
<td>.529**†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.239)</td>
<td>(.168)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.372</td>
<td>.110</td>
<td>.640***†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.236)</td>
<td>(.236)</td>
<td>(.165)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-.246</td>
<td>-.607*</td>
<td>-.718***†</td>
<td>-.078</td>
</tr>
<tr>
<td></td>
<td>(.249)</td>
<td>(.249)</td>
<td>(.246)</td>
<td>(.183)</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01, *** p<.001, † significant after applying Holm’s sequential Bonferroni post hoc test at p<.05 for group of 10 comparisons

Table 10 indicates PE significantly predicts BI in conditions 2 and 3, and that condition 3 is significantly different from condition 4. Condition 2 is also different from condition 4, but this difference should not be considered significant in light of more stringent post hoc analysis.

Taken together, Tables 9 and 10 provide some limited support for H2. PE predicts AB and BI more consistently in local conditions, and in the high efficacy global condition. The low efficacy global efficacy condition has a consistent negative relation between PE and AB and BI, and in 3 of 4 cases, the slope of this relationship is significantly different from other groups. Chart 2 illustrates this basic difference by comparing the relationship of PE to AB in conditions 2 (local/low efficacy) and 4 (global/low efficacy).
Holding message efficacy constant (low), PE is a stronger predictor of AB in the local condition. This also holds for PE as a predictor of BI, although this result is not as significant and should be considered in the light of post hoc analysis.

H3 stated that the relationship between environmental values and attitudes toward the behavior and behavioral intentions is mediated by construal level, such that people with higher levels of environmental values will construe issues in more idealistic terms and exhibit more positive attitudes toward the behavior and behavioral intentions.

As discussed above, Preacher et al. (2007) argue that the preferred method for single- and multiple-mediation analysis is a product of coefficients approach, employing bootstrapping to determine confidence intervals. The authors have developed an SPSS macro that conducts such analysis. Based on these tests, idealistic construal (IC) is a significant mediator of the EV => AB and the EV => BI relationships, strongly supporting H3.
Although H3 refers specifically only to IC, multiple mediation analysis allows for the simultaneous examination of multiple possible mediators, and contrasts between them. Because PE has emerged as a separate possible mediating variable in the data, it is included in the analysis. Including all observed mediators that are potentially impacting relationships is akin to conducting multiple regression analysis with several predictors to see if there is an overall effect. It also allows the researcher to compare the relative strengths of mediators and evaluate different causal models (Preacher, et al., 2007). Like multiple regression, however, the effects of mediators in a multiple mediation model are attenuated to the degree the mediators are correlated; the model accounts only for the unique variance each mediator explains. Results are summarized in Table 11. Results include the point estimate (the product of coefficients produced by the model), the standard error (SE) and calculated Z score for the point estimate, and the associated normal theory p value. For less biased estimates with small sample sizes, bootstrapping percentile 95% confidence interval (CI) lower and upper limits are provided. If the percentile CI does not contain zero, the null hypothesis (no mediating effect) can be rejected. The table also includes a contrast of the two proposed mediating variables (ICxPE), which indicates if there is a statistically significant difference in magnitude of the effects of the two mediators being contrasted.
### Table 11
Mediation table of EV on AB and BI through IC and PE

<table>
<thead>
<tr>
<th>Indirect effect on:</th>
<th>Point estimate</th>
<th>Product of coefficients</th>
<th>Normal theory p value</th>
<th>Percentile 95% CI Lower</th>
<th>Percentile 95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SE</td>
<td>Z</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>.2594</td>
<td>.0483</td>
<td>5.3701</td>
<td>.0000</td>
<td>.1657</td>
</tr>
<tr>
<td>PE</td>
<td>.0478</td>
<td>.0198</td>
<td>2.4092</td>
<td>.0160</td>
<td>.0088</td>
</tr>
<tr>
<td>Total</td>
<td>.3072</td>
<td>.0538</td>
<td>5.7117</td>
<td>.0000</td>
<td>.1955</td>
</tr>
<tr>
<td>ICxPE</td>
<td>.2116</td>
<td>.0506</td>
<td>4.1796</td>
<td>.0000</td>
<td>.1157</td>
</tr>
<tr>
<td>BI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>.2866</td>
<td>.0527</td>
<td>5.4381</td>
<td>.0000</td>
<td>.1810</td>
</tr>
<tr>
<td>PE</td>
<td>.0098</td>
<td>.0135</td>
<td>.7239</td>
<td>.4692</td>
<td>-.0190</td>
</tr>
<tr>
<td>Total</td>
<td>.2965</td>
<td>.0534</td>
<td>5.5519</td>
<td>.0000</td>
<td>.1899</td>
</tr>
<tr>
<td>ICxPE</td>
<td>.2768</td>
<td>.0555</td>
<td>4.9922</td>
<td>.0000</td>
<td>.1627</td>
</tr>
</tbody>
</table>

This result indicates that IC is a significant mediator of both the EV => AB and EV => BI relationships, supporting H3. In addition, the mediating role of IC is significant above and beyond the mediation provided by PE, and its mediation of the relationship is a significant order of magnitude larger than the mediating effect of PE. This analysis also shows that PE is a significant unique mediator of the EV => AB relationship, but not of the EV => BI relationship.

### Research Questions

The foregoing results form the basis of the ensuing research questions. Although EV and the distance and efficacy message factors had minimal direct effects on the outcome variables AB and BI, further analysis indicated this relationship is significantly mediated by IC (for both AB and BI) and by PE (for AB). Therefore, the effects of EV and the message distance and efficacy factors on these mediating variables should be examined.

Multiple regression was used to test these relationships. IC was regressed on EV, along with D and E and all two- and three-way interaction terms. Results indicated that in the full
model EV is a significant predictor of IC, $\beta=.42$, $t(219)=3.20$, $p<.01$. On its own, EV explained a significant amount of the variance in, $R^2=.15$, $F(225)=39.75$, $p<.001$. In addition, in the full model, the EVxDxE three-way interaction term was a significant predictor of IC, $\beta=.63$, $t(219)=2.38$, $p<.05$. All variables were added to the model in blocks, with the three-way interaction being last; it significantly increased the amount of variance in IC explained in the model, $R^2$ change=.02, $p<.05$. In the full model, the DxE interaction term was also significant, $\beta=-3.32$, $t(219)=-2.28$, $p<.05$.

Next, PE was regressed on EV in the same general model. On its own, EV was a significant predictor of PE, $\beta=.20$, $t(225)=3.10$, $p<.01$, and explained a significant amount of the variance in PE, $R^2=.04$, $F(225)=9.60$, $p<.001$. However, in the full model EV was no longer a statistically significant unique predictor of PE. In addition, in the full model, the EVxDxE three-way interaction term was a significant predictor of PE, $\beta=.66$, $t(219)=2.47$, $p<.05$. All variables were added to the model in blocks, with the three-way interaction being last; it significantly increased the amount of variance in IC explained in the model, $R^2$ change=.03, $p<.05$. The DxE interaction term was also significant in this full model, $\beta=-3.33$, $t(219)=-2.27$, $p<.05$.

These results indicate that EV is an important predictor of both IC and PE, but that these effects are moderated by message distance and efficacy factors. Indeed, in the second full model, the EV variable was no longer a statistically significant unique predictor of PE. This may be explained in part by the unexpected finding that perceived efficacy is significantly affected by message distance. In addition, in each full model, the DxE interaction was significant. This may be in part an artifact of the study design. The DxE interaction term is essentially the
difference between condition 3 (global/high efficacy) and the other conditions. Because of the coding scheme (local=0, low efficacy=0), only for condition 3 is this term not zero. Condition 3 may have some unique features in terms of these relationships. This possibility will be explored in the by-condition tests that follow interpretation of the significant three-way interactions found in the preceding analysis.

One approach to plotting, comparing slopes and interpreting three-way interactions had been develop by Dawson and Richter (2006). Chart 3 uses this technique, placing message distance on the X axis and creating two sets of two lines for high and low message efficacy and high and low EV (as mentioned previously, high and low values of EV are defined as one SD above and below the mean).

Chart 3

**Relationship of Message Distance and Efficacy to IC at high and low levels of EV**

![Chart 3](chart3.png)
As this chart illustrates, people with higher levels of EV tend to construe their message responses in more idealistic terms. This general result holds regardless of message efficacy or message distance. Important differences in reactions emerge when considering people with low EV. In what appears to be a boomerang effect, people with low EV exposed to low message efficacy held the same general level of construal, regardless of issue distance. However, people with low EV exposed to high message efficacy conditions had lower idealistic construal in the global condition. Additional interpretation of this result will appear in the discussion section.

Tests are also available for assessing the statistical significance of differences in line slopes (Dawson & Richter, 2006). Based on these techniques, the difference in slopes between lines 1 and 3 above are significant, p<.05. Applying a strict post hoc test for six comparisons, such as Holm’s sequential Bonferroni, this finding would not reach significance. However, for exploratory and interpretive purposes, these line slopes and group differences are worthy of analysis.

The three-way interaction of EV, D and E on PE is illustrated in Chart 4.
As noted in the analysis of the multiple regression model of PE, EV is not a significant predictor of PE in the full model. That outcome is illustrated here. For some combinations of variables, people with low EV end up with higher PE than people with high EV. Significance of slopes analysis on this three-way interaction indicates that the slopes of lines 1 and 2 above are different (again, this significance would not withstand application of a strict post-hoc test). It is again interesting to note that for people with low EV in the global condition, low efficacy messages lead to a higher level on the dependent variable than high efficacy messages.

The relationship of EV to IC and PE can also be examined by condition, using the same dummy-coding multiple regression approach described above (the full equations for these models will not be provided, but they will be identical other than the dependent and continuous independent variables). The results of these tests are shown in Tables 12 and 13.
Table 12
Relationship of EV to IC across four treatment conditions, unstandardized regression coefficients and (standard errors)

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.291*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.130)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.132</td>
<td>.423**†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.185)</td>
<td>(.132)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.475*</td>
<td>.344</td>
<td>.767***†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.175)</td>
<td>(.198)</td>
<td>(.148)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-.020</td>
<td>-.152</td>
<td>-.495**</td>
<td>.271*</td>
</tr>
<tr>
<td></td>
<td>(.174)</td>
<td>(.175)</td>
<td>(.187)</td>
<td>(.115)</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01, *** p<.001, † significant after applying Holm’s sequential Bonferroni post hoc test at p<.05 for group of 10 comparisons

As can be seen, EV is a significant predictor of CI in conditions 2 and 3. In addition, the relationship between these variables in condition 3 is significantly different than in conditions 4 and 1 (although these differences are no longer significant if a strict post hoc test is applied). Although not noted in the table, the difference between condition 3 and condition 2 approaches significance (p=.084).
Table 13
Relationship of EV to PE across four treatment conditions, unstandardized regression coefficients and (standard errors)

<table>
<thead>
<tr>
<th>Omitted Cond.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.179 (.131)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.045 (.187)</td>
<td>.224 (.133)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.356 (.199)</td>
<td>.310 (.200)</td>
<td>.534***†</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-.256 (.175)</td>
<td>-.301 (.177)</td>
<td>-.612***†</td>
<td>-.077 (.116)</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01, *** p<.001, † significant after applying Holm’s sequential Bonferroni post hoc test at p<.05 for group of 10 comparisons

This table reflects the fact that EV is less of a predictor of PE than of IC. The relationship is only significant in condition 3, and the relationship in condition 3 is significantly different than in condition 4.

To facilitate further interpretation, these relationships can be plotted using the unstandardized coefficients and constants from each regression equation, controlling for the conditions not being plotted by holding them at their means and adjusting the constant. Chart 5 shows the difference in relationships between EV and IC in conditions 3 and 4 (as noted above, the difference does not achieve statistical significance after post hoc tests).
The only difference in these two conditions is manipulated message efficacy. It therefore appears that when talking about distant issues, high message efficacy promotes higher idealistic construals among people with higher levels of EV. Chart 6 illustrates differences in the relationship of EV to PE in conditions 3 and 4 (differences statistically significant after post hoc tests).
Here, an opposite effect seems to be taking place. When talking about a global issue, lower message efficacy results in higher perceived efficacy for people with higher levels of EV. This counterintuitive result is similar to the boomerang effect apparent in the analysis of the three-way interaction presented above. Among some people, lower message efficacy appears to increase perceived efficacy. Or, conversely, higher message efficacy appears to decrease perceived efficacy.

RQ3 explored the relationship between IC and PE and message processing. Ad involvement (AI) was used as a self-reported measure of message processing, and the relationship among these variables was explored using bivariate and multiple regression. On its own, PE was a marginally significant predictor of AI, $\beta=.18, t(225)=2.0, p<.05$, and explained a small but significant amount of the variance in AI, $R^2=.02, F(225)=3.97, p<.05$. IC was, on its own, was a stronger predictor of AI, $\beta=.54, t(225)=6.9, p<.001$, and explained a significant amount of the variance in AI, $R^2=.23, F(225)=47.68, p<.001$. When IC and PE were both entered into the equation, there was no additional variance in AI explained beyond that explained by IC alone, and while IC remained a significant predictor of AI, $\beta=.53, t(225)=6.5, p<.001$, PE did not. Based on these results, PE has marginal predictive power relative to AI, and has no unique predictive power beyond that provided by IC.

As noted in the discussion of variables measured, several other scales that represent conceptually intermediate steps between message reception and attitude formation were collected during the survey (Ad involvement, credibility, ad liking, etc.). Univariate ANOVA was
used to see if message distance and efficacy factors had any direct effects on these measures. None of the results was significant.

**A Model of Environmental Message Effects**

Although message distance and efficacy factors were not found to have significant direct effects on the ultimate dependent variables of attitude toward the behavior or behavioral intention, these factors did have significant effects on the mediating variables of idealistic construal and perceived efficacy. To further examine the relationships among these variables, path analysis was employed to test an overall model of message effects. Path analysis tests a model of relationships between observed variables by measuring the independent variables without error (Raykov & Marcoulides, 2006).

The goal of the model is to significantly predict variance in the ultimate outcome variables of AB and BI, as parsimoniously as possible. As discussed in the data analysis techniques section above, there are a number of fit indices that need to be examined to ensure the model adequately fits the data. Researcher designed models imply a variance/covariance matrix, and fit indices examine how well the implied variance/covariance matrix fits the actual data variance/covariance matrix. For this reason, path analysis does not require an entire dataset, only a variance/covariance matrix from the dataset in question that includes the variables of interest. For this study, a variance/covariance matrix from the data was used to create a variance/covariance table, a special type of SPSS data file. Path analysis of this SPSS data file was conducted using AMOS 16.0.
The model was specified based on the theoretical underpinnings of the study. EV and message factors were hypothesized to affect attitudinal and behavioral outcomes through level of construal (specifically, idealistic construals). Data analysis indicated a possible mediating role for PE as well, and mediation analysis indicated that IC mediated the EV => AB and EV => BI relationships, and that PE mediated the EV => AB relationship. Further analysis of the relationship between EV and message factors revealed a three-way interaction of these variables on both IC and PE. Based on these results, EVx Dx E was modeled to predict IC and PE, IC was modeled to mediate both AB and BI, and PE was modeled to mediate AB. As is standard in attitude research, AB was modeled to predict BI. Error terms for multiple mediators were allowed to covary (Preacher et al., 2007). This model is presented in Diagram 1, with the standardized path coefficients for outcome variables indicated.
Model fit indicators and the significance of standardized coefficients are presented in Tables 14 and 15, respectively.
Table 14
Model fit for model of environmental message effects

<table>
<thead>
<tr>
<th>Model Fit Index</th>
<th>Criteria</th>
<th>Fit Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>≥ .005</td>
<td>1.8 (df=3)</td>
</tr>
<tr>
<td>Significance (p)</td>
<td>p ≥ .05</td>
<td>.62</td>
</tr>
<tr>
<td>Chi-square/degrees of freedom</td>
<td>≤ 3</td>
<td>.60</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>≥ .90</td>
<td>1.0</td>
</tr>
<tr>
<td>Goodness of Fit Index (GFI)</td>
<td>≥ .90</td>
<td>1.0</td>
</tr>
<tr>
<td>Normed Fit Index (NFI)</td>
<td>≥ .90</td>
<td>.96</td>
</tr>
<tr>
<td>Root Mean Squared Error Approximation (RMSEA)</td>
<td>≤ .05</td>
<td>.00</td>
</tr>
</tbody>
</table>

Table 15
Significance of standardized path coefficients in model of environmental message effects

<table>
<thead>
<tr>
<th>Paths</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVxDxE → IC</td>
<td>.12*</td>
</tr>
<tr>
<td>EVxDxE → PE</td>
<td>.22***</td>
</tr>
<tr>
<td>IC → AB</td>
<td>.58***</td>
</tr>
<tr>
<td>IC → BI</td>
<td>.40***</td>
</tr>
<tr>
<td>PE → AB</td>
<td>.20***</td>
</tr>
<tr>
<td>AB → BI</td>
<td>.42***</td>
</tr>
</tbody>
</table>
* p < .05; ** p < .01; *** p < .001 (one-tailed tests)

Finally, Tables 16 through 18 provide the standardized total, direct and indirect effects represented in the model (standardized values are used to allow comparison between the EVxDxE interaction term with the other variables measured on a 7-point metric). These tables indicate the effects of each column variable on each row variable.
Table 16
Standardized total effects for model of environmental message factors

<table>
<thead>
<tr>
<th>EVxDxE</th>
<th>PE</th>
<th>IC</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>.22</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>IC</td>
<td>.12</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>AB</td>
<td>.15</td>
<td>.20</td>
<td>.58</td>
</tr>
<tr>
<td>BI</td>
<td>.10</td>
<td>.09</td>
<td>.65</td>
</tr>
</tbody>
</table>

Table 17
Standardized direct effects for model of environmental message factors

<table>
<thead>
<tr>
<th>EVxDxE</th>
<th>PE</th>
<th>IC</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>.22</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>IC</td>
<td>.12</td>
<td>.00</td>
<td>.00</td>
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<tr>
<td>AB</td>
<td>.00</td>
<td>.24</td>
<td>.58</td>
</tr>
<tr>
<td>BI</td>
<td>.00</td>
<td>.00</td>
<td>.40</td>
</tr>
</tbody>
</table>

Table 18
Standardized indirect effects for model of environmental message factors

<table>
<thead>
<tr>
<th>EVxDxE</th>
<th>PE</th>
<th>IC</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>IC</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>AB</td>
<td>.15</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>BI</td>
<td>.10</td>
<td>.09</td>
<td>.25</td>
</tr>
</tbody>
</table>
Based on the model, therefore, for each standard deviation increase in EVxDxE, there is a .22 standard deviation increase in IC and a .12 standard deviation increase in PE. As was evident in the regression analysis, through an interaction with EV, the message factors D and E have a moderate but significant direct effect on the mediating variables PE and IC. This model further shows the small but significant indirect effect these variables have on AB and BI. IC is identified as an important mediating variable. For each standard-deviation increase in IC there is a .65 standard-deviation increase in BI.
Discussion

The foregoing analysis builds a case for the role of distance and efficacy message factors in psychological responses to environmental communications. In addition, idealistic construal and perceived efficacy are identified as important mediators. A model of environmental message effects predicts moderate but significant effects of distance and efficacy message factors, interacting with pre-existing values, on idealistic construal and perceived efficacy, and small but significant indirect effects, through idealistic construal and perceived efficacy, on attitudes toward pro-environmental behaviors and behavioral intentions. In addition to these overall findings, a number of interesting, unexpected and potentially important results were reported.

The role that perceived efficacy plays in the formation of environmental attitudes and behavioral intentions has been mixed in prior research. It is a central element in TPB, but has been found to have no effect when it comes to environmental behaviors (Rogers & Prentice-Dunn, 1997; Wong & McMurray, 2002). In other studies, efficacy was found to have as strong a relationship to intentions as values (Kellstedt et al., 2008). Such results, however, run counter to the dominant finding in environmental research that people’s attitudes and behaviors tend to be more a function of their values (Taylor & Todd, 1997).

One possible explanation for the incongruent findings is the treatment of “the environment” as a monolithic issue (Dunlap & Jones, 2002). Local environmental issues with immediate personal health implications should not be considered the same as global issues with distant and unclear consequences. The relationship between issue distance and perceived efficacy, and how these two variables are treated in communications, is a matter of immediate
concern for the environmental movement. The issue of global warming is believed to elicit lower levels of perceived response efficacy, and therefore lower levels of behavioral intentions (Crompton, 2008). There is a real concern that people will feel helpless in the face of such a huge challenge and elect to do nothing, because they don’t believe they can make a difference. This study suggests that such concerns may be misguided. Indeed, global issues appear to result in greater perceived efficacy, not less.

This study sought to explore possible interactions among environmental values, issue distance, efficacy and attitudes and intentions. The results indicate that a complex interaction of variables is at work. Although the main hypotheses were not supported, there were differences among treatment conditions on the variables of interest.

Analysis indicated environmental values were a significant predictor of environmental attitudes in conditions 2 (local/low efficacy) and 3 (global high efficacy), but not in the other groups. It appears different combinations of issue distance and efficacy may determine the relevance of environmental values. For local issues, low efficacy messages result in a more significant values-attitude relationship, whereas for global issues, high efficacy messages result in a more significant values-attitude relationship. In terms of behavioral intentions, values were a strong predictor in all four conditions. The failure to find differences among the groups in terms of the values-attitude and values-intentions relationships may well be due to the fact that values are such an important predictor in all conditions. Findings did provided limited support for the idea that low-efficacy global messages failed to engage people’s environmental values. While this study suggests manipulating efficacy is difficult if not impossible, it still
appears to be an important message factor, especially when communicating about global warming.

The relationship of perceived efficacy to attitudes and intentions was also different across conditions. Perceived efficacy predicted attitudes in conditions 1 (local/high efficacy), 2 (local/low efficacy) and 3 (global/high efficacy). In addition, the relationship of perceived efficacy to attitudes was significantly different in condition 4 (global/low efficacy) than in conditions 2 and 3. In terms of behavioral intentions, perceived efficacy was a significant predictor in condition 2 and 3, and condition 4 was again different from conditions 2 and 3. These results provide limited support for the notion that the perceived efficacy-attitudes and perceived efficacy-intentions relationships are stronger in local conditions. The exception of course is the high-efficacy global condition. In addition, low-efficacy global messages failed to engage response efficacy as a positive predictive variable.

The impact of values on attitudes and behavioral intentions was further examined by analyzing the mediating role of construal level. Idealistic construals were found to significantly mediate the values-attitudes and values-intentions relationships, while perceived efficacy (a previously identified mediating variable in environmental decision-making research) was found to only mediate the values-attitudes relationship. This finding identifies construal level as a critical variable in the study of environmental behavior. The path from values to actions runs through idealistic construals, and idealistic construals are in turn moderated by message factors.
A significant three-way interaction among environmental values, message distance and message efficacy indicates that people with higher levels of environmental values tend to construe their responses to pro-environmental messages more idealistically. In addition, the more global and the higher the message efficacy, the more idealistic they construe their actions. This pattern does not hold, however, for those with lower levels of environmental values. Quite the opposite. For those with lower environmental values, the more global the issue, and the higher the level of message efficacy, the less ideally they construe their responses. This could be because people with low environmental values are cynical about being told “we can do it” when it comes to an issue as large as global warming. So while efficacy messages appear to enhance construal levels among those with high environmental values when it comes to global environmental issues, the opposite is true among those with low environmental values.

Environmental values and message distance and efficacy also combined in a three-way interaction to affect perceived efficacy. Again, those with higher levels of environmental values had higher general levels of perceived efficacy, but not always. And again, for those with higher levels of environmental values, global messages with high efficacy produced higher levels of perceived efficacy, but for those with lower levels of environmental values, the results were different. For those with lower levels of environmental values, global messages associated with low efficacy resulted in higher levels of perceived efficacy. Again, some kind of boomerang effect may be taking place whereby people with low levels of environmental values react negatively to high-efficacy messages about global environmental issues.
These results suggest environmental communicators should focus on how humans are connected to nature in an effort to raise the general level of environmental values. When targeting messages, they should be weary of highly efficacious global warming messages when communicating with audiences characterized by low environmental values (the variables typically negatively related to environmental concern were discussed in the “Psychological level theories of persuasion” above). In light of these findings, the We Campaign may have a positive impact on audiences with high environmental values, but backfire among those with lower environmental values. From a marketing point of view, the campaign may be selling to those who already believe their primary message, and turning off the people whose attitudes they need to change the most.

Another interesting finding that resulted from this study was the difficulty of manipulating efficacy. Indeed, perceived efficacy may be more of a value set, like pre-existing environmental concern, than a cognitive message response. Efficaciousness may be a multi-dimensional construct with multiple determinants. If people are indeed sense-making when they respond to self reports of response efficacy, it may explain the difficulty in reliably measuring responses. Further investigation could work to identify the cognitive, affective and behavioral determinants of perceived efficacy. As pointed out in the results section, one possible factor could be construal level. This factor is all the more relevant to communications researchers because it can be manipulated through message framing. Although there was no main effect on perceived efficacy for message efficacy level, there was a main effect for message distance, whereby participants in the global conditions reported feeling significantly more efficacious than participants in the local conditions. This was especially true for people in
the high efficacy conditions. Among just participants in high efficacy conditions, those in the
global conditions reported significantly higher perceived efficacy ($M=5.4$, $SD=1.6$) than those in
local conditions ($M=4.9$, $SD=1.1$), $t(111)=-2.32$, $p<.05$. 
Limitations and Future Research

Despite the strengths of this design, there are limitations. The vast majority of the participants were from the same culture, geographic area, education level and age group. This limits the generalizability of the results. Because the study measured primitive level psychological variables (such as values) and the message manipulations were at a psychological level, these limitations can be tolerated. Most of the research that has been done on construal-level theory has been done with college students, and results from these experiments have been replicated in other populations. But because age has been identified as an important variable in the study of environmental concern, research should be extended to older populations. Indeed, one drawback of the study may have been the relatively strong and consistent environmental values, attitudes and intentions among the sample. Including older, and presumably less environmental, participants in the analysis may generate more diverse and interesting results.

The utility of MediaLab survey software for such an experiment is also worth considering. Although there are clear benefits, there may also be drawbacks. The software eliminates the need for data entry, can control input fields and randomize items and assignment to experimental conditions. However, the possibility of lackadaisical responses needs to be considered. When response items are similarly formatted (which was the standard approach taken for this survey), response options appear in the exact same position from one screen to the next. Therefore, a participant could not move the mouse at all, and just continue to click off responses to get to the next item in the survey. For most pencil-and-paper surveys, and most online surveys, the participant has to move the pencil (or mouse) to the next item,
and the question is which response they move it to. With this type of software, the participant does not have to move the mouse to get to the next item, and the question is if they move the mouse at all. In addition, with pencil-and-paper surveys and most online surveys, a participant who is answering all “4s” can see the pattern of what they are doing, and may therefore feel somewhat conscientious about it. With MediaLab, once an item is clicked, it disappears into the ether, such that no one, including the participant, can look back at the pattern of their responses (that is, until the research opens the data set for analysis).

In terms of future research, the results of this study suggest a number of interesting possibilities. The identification of idealistic construal as a mediating variable in environmental decision-making should be replicated and further explored. And, as suggested in other recent research articles (Roser-Renouf & Nesbit, 2008), the nature of perceived efficacy needs to be further explicated. Most significantly, the relationship between construal level and perceived efficacy should be studied. The finding that issue distance resulted in different levels of perceived efficacy is intriguing. There are theoretical reasons to speculate that the two may be related. Certainly, an issue or problem presented as immediate or near-term may lead to lower perceptions of efficacy, simply because there may not seem to be enough time to take action. In a similar vein, it may be easier to imagine someone else changing their behavior than thinking about changing one’s own. And far-off, abstract problems may lead to more efficacious representations than near-by concrete ones. Sending off a check to combat starvation in Darfur may lead to a greater sensation of “helping” than donating to a local food bank. The distant and invisible catastrophe can be improved in one’s imagination, but evidence of ameliorating a local
problem must be seen with one’s own eyes. Future empirical research can establish if construal level and perceived efficacy are indeed psychologically linked.
References


# Appendix A

## Stimulus Material Voiceover Script and Onscreen Text

<table>
<thead>
<tr>
<th>Local/Low</th>
<th>Local/High</th>
</tr>
</thead>
<tbody>
<tr>
<td>(onscreen text only)</td>
<td></td>
</tr>
<tr>
<td>Happy Valley Is At Risk</td>
<td></td>
</tr>
<tr>
<td>There is a growing environmental threat right here in Happy Valley. The surrounding mountains that make the area so appealing and picturesque are also contributing to a significant risk—photochemical smog.</td>
<td></td>
</tr>
<tr>
<td>Continued development is significantly increasing emissions of greenhouse gasses, pushing us toward unsafe levels of ground-level ozone, a dangerous type of human-caused environmental smog.</td>
<td></td>
</tr>
<tr>
<td>The EPA has concluded that Happy Valley one of only 345 counties in the country that will fail to meet new air quality standards and face serious associated environmental risks.</td>
<td></td>
</tr>
<tr>
<td>(Risk; onscreen text only): Reduced Visibility, Asthma and Emphysema.</td>
<td></td>
</tr>
<tr>
<td>It’s not too late to prevent air quality degradation in Happy Valley!</td>
<td></td>
</tr>
<tr>
<td>A new state law under consideration will help prevent this threat. There will be costs to be sure, but isn’t clean air in Happy Valley worth it?</td>
<td></td>
</tr>
<tr>
<td>The solution is within our reach and the time to act is now!</td>
<td></td>
</tr>
<tr>
<td>The Central Pennsylvania Air Quality Foundation is fighting for adoption of this legislation through lobbying, public relations and citizen action. With your support, we can win this fight! Please visit our website at <a href="http://www.cpaqf.org">www.cpaqf.org</a> and find out how you can help.</td>
<td></td>
</tr>
<tr>
<td>(onscreen text only) The [Central Pennsylvania/Global] Air Quality Foundation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Global/Low</th>
<th>Global/High</th>
</tr>
</thead>
<tbody>
<tr>
<td>(onscreen text only)</td>
<td></td>
</tr>
<tr>
<td>The Planet Is At Risk</td>
<td></td>
</tr>
<tr>
<td>There is a growing environmental threat to the planet. The delicate natural balance that made it possible for life to develop and flourish here on earth is now the source of a significant risk—global warming.</td>
<td></td>
</tr>
<tr>
<td>Continued development is significantly increasing emissions of greenhouse gasses, pushing us toward unsafe levels of climate change, a dangerous type of human-caused environmental disruption.</td>
<td></td>
</tr>
<tr>
<td>The Nobel-Prize winning IPCC report concluded there is no longer any reasonable doubt that aggressive action is essential to prevent serious environmental risks.</td>
<td></td>
</tr>
<tr>
<td>(Risk; onscreen text only): Rising Seas, Crop Failures, Species Extinction</td>
<td></td>
</tr>
<tr>
<td>It’s not too late to prevent global warming!</td>
<td></td>
</tr>
<tr>
<td>The new international treaty under consideration will help prevent this threat. There will be costs, to be sure, but isn’t saving the earth’s delicate natural balance worth it?</td>
<td></td>
</tr>
<tr>
<td>The solution is within our reach and the time to act is now!</td>
<td></td>
</tr>
<tr>
<td>The Global Air Quality Foundation is fighting for adoption of this new treaty through lobbying, public relations and citizen action. With your support, we can win this fight! Please visit our website at <a href="http://www.gaqf.org">www.gaqf.org</a> and find out how you can help.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B

Complete Survey

Screen breaks are indicated by “+++++” and response options are in tables below question items. [Text in brackets did NOT appear in the survey, and is included to explain auto randomization procedures.] The on-screen survey was formatted with a dark, sans-serif typeface on a light blue background. All response items were numbered gray buttons located next to response option text, aligned vertically from low (on top) to high (on the bottom). Choosing an option advances to the next screen. Instruction screens all included a “continue” link in the bottom right corner.

[Start]
In this study, you will be asked to view an advertisement, and then answer a few questions related to your attitudes and opinions.
FOLLOW THE INSTRUCTIONS COMPLETELY. PLEASE READ THE INFORMATION ON EACH PAGE CAREFULLY.
Any time you see instructions (like this page), there will be a continue button at the bottom right that you can click when done reading.
If you have any questions during the session, just raise your hand. You can skip a question at any time if you don't feel comfortable answering by hitting Ctl+right arrow.
+++++
First, we would like to ask you a few questions about yourself.
+++++
Gender
0 Male 1 Female 2 Transgender
+++++
Category that best describes your ethnicity?
1 2 3 4 5 6
White (non-Hispanic) Black/African American Hispanic/Latino Asian Multiracial Other
+++++
Academic year?
1 2 3 4
Freshman Sophomore Junior Senior
+++++
Estimated family income?
1 2 3 4 5
Less than $50,000 $50,001 to $100,001 $100,001 to $150,001 to $150,001 to $200,000 More than $200,000
+++++
[The following sets of questions on social security, the environment and gun control were presented randomly between groups; individual items were randomized within the three groups.]

[Social Security dummy questions 1]

People in the United States are generally concerned about Social Security. However, people differ in the consequences that concern them most. Please rate each of the following items from 1 (not important) to 7 (very important).

I am concerned about Social Security because of the consequences for myself.

1 2 3 4 5 6 7
Not important Neutral Very Important

I am concerned about Social Security because of the consequences for family.

1 2 3 4 5 6 7
Not important Neutral Very Important

I am concerned about Social Security because of the consequences for the economy.

1 2 3 4 5 6 7
Not important Neutral Very Important

I am concerned about Social Security because of the consequences for future generations.

1 2 3 4 5 6 7
Not important Neutral Very Important

I am concerned about Social Security because of the consequences for my lifestyle.

1 2 3 4 5 6 7
Not important Neutral Very Important

I am concerned about Social Security because of the consequences for federal budget deficits.

1 2 3 4 5 6 7
Not important Neutral Very Important

[Environmental concern]

People around the world are generally concerned about environmental problems because of the consequences that result from harming nature. However, people differ in the consequences that concern them most. Please rate each of the following items from 1 (not important) to 7 (very important).

I am concerned about environmental problems because of the consequences for plants.
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not important</td>
<td>Neutral</td>
<td>Very Important</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

+++++

I am concerned about environmental problems because of the consequences for marine life.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for birds.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for animals.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for me.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for my lifestyle.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for my health.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for my future.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for people in my country.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for all people.

1 2 3 4 5 6 7
Not important Neutral Very Important

+++++

I am concerned about environmental problems because of the consequences for children.

1 2 3 4 5 6 7
Not important Neutral Very Important
+++++
I am concerned about environmental problems because of the consequences for future
generations.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
[Gun control dummy questions 1]
+++++
People in the United States are generally concerned about gun control. However, people differ
in the consequences that concern them most. Please rate each of the following items from 1
(not important) to 7 (very important).
+++++
I am concerned about gun control because of the consequences for myself.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
I am concerned about gun control because of the consequences for my personal safety.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
I am concerned about gun control because of the consequences for social stability.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
I am concerned about gun control because of the consequences for crime.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
I am concerned about gun control because of the consequences for the Constitution.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
I am concerned about gun control because of the consequences for public safety.
1  2  3  4  5  6  7
Not important Neutral Very Important
+++++
[Between and within group randomization end.]
+++++
[Political identity]
+++++
We would like to ask you a few questions about your political orientation and political party
affiliation.
+++++
125
I considered myself a:
1 2 3 4 5 6 7
Strong Democrat Moderate Democrat Independent Democrat Independent-minded Democrat Independent-minded Republican Moderate Republican Strong Republican

+++++
I am a registered:
1 2 3 4 5
Democrat Republican Independent Other Not registered

+++++
In the upcoming presidential election, I plan on supporting:
1 2 3 4 5
The Democratic candidate The Republican candidate An Independent candidate Other Undecided

+++++
Where would you place yourself on this scale?
1 2 3 4 5 6 7
Extremely liberal Liberal Slightly liberal Moderate, middle of the road Slightly conservative Conservative Extremely conservative

+++++
[Materialism / consumerism]
+++++
Please indicate the degree to which you agree with the following statements.
+++++
It is important to me to have really nice things.
1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

+++++
I would like to be rich enough to buy anything I want.
1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

+++++
I'd be happier if I could afford to buy more things.
1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

+++++
People place too much emphasis on material things
1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

+++++
It's really true that money can buy happiness
1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree
[Need for cognition]

Now we would like to ask a few questions about your general outlook on life. For each of the items below, please indicate to what extent the statement is characteristic of you.

### I would prefer complex to simple problems.

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<td>Somewhat uncharacteristic of you</td>
<td>Uncertain</td>
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### I like to have the responsibility of handling a situation that requires a lot of thinking.

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### Thinking is not my idea of fun.

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### I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.

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### I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.

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### I find satisfaction in deliberating hard and for long hours.

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</tr>
</tbody>
</table>
I only think as hard as I have to.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++

I prefer to think about small, daily projects than long-term ones.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++

I like tasks that require little thought once I've learned them.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++

The idea of relying on thought to make my way to the top appeals to me.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++

I really enjoy a task that involves coming up with new solutions to problems.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++

Learning new ways to think doesn't excite me very much.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++

I prefer my life to be filled with puzzles that I must solve.

1 2 3 4 5
Extremely Somewhat Uncertain Somewhat Extremely
uncharacteristic uncharacteristic characteristic of characteristic of
of you of you you you
+++++
The notion of thinking abstractly is appealing to me.

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I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

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I feel relief rather than satisfaction after completing a task that required a lot of mental effort.

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It's enough for me that something gets the job done; I don't care how or why it works.

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[The following sets of questions on social security, the environment and gun control were presented randomly between groups; individual items were randomized within the three groups.]

[Social Security dummy questions 2]
Strongly disagree Neutral Strongly agree
+++++
Social Security: The government should help people save for retirement by making tax-free accounts available for this purpose and letting people save as much as they desire.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
Social Security: The government should ensure a minimal level of retirement income for all citizens through a mandatory national retirement plan.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
Social Security: People should have the right to choose how much they save for retirement.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
Social Security: Social security should be privatized so people can manage their own investments.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
[New Ecological Paradigm]
+++++
Now we would like to find out more specifics about your views on the environment.
+++++
The environment: We are approaching the limit of the number of people the earth can support.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
The environment: Humans have the right to modify the natural environment to suit their needs.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
The environment: When humans interfere with nature it often produces disastrous consequences.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
The environment: Human ingenuity will insure that we do NOT make the earth unlivable.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++
130
The environment: Humans are severely abusing the environment.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: The earth has plenty of natural resources if we just learn how to develop them.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: Plants and animals have as much right as humans to exist.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: The balance of nature is strong enough to cope with the impacts of modern industrial nations.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: Despite our special abilities humans are still subject to the laws of nature.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: The so-called "ecological crisis" facing humankind has been greatly exaggerated.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: The earth is like a spaceship with very limited room and resources.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: Humans were meant to rule over the rest of nature.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: The balance of nature is very delicate and easily upset.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
+++++

The environment: Humans will eventually learn enough about how nature works to be able to control it.

1 2 3 4 5
Strongly disagree Neutral Strongly agree
++++++
The environment: If things continue on their present course, we will soon experience a major ecological catastrophe.

Strongly disagree Neutral Strongly agree

Gun control dummy questions 2

Now we would like to find out more specifics about your views on gun control.

Gun control: The Second Amendment of the constitution provides a clear, absolute right for law-abiding citizens to own any kind of gun they choose.

Strongly disagree Neutral Strongly agree

Gun control: In order to protect citizens in schools, workplaces and other public spaces, it is reasonable for the government to place restrictions on gun ownership.

Strongly disagree Neutral Strongly agree

Gun control: There is no reason for anyone to need to own a gun.

Strongly disagree Neutral Strongly agree

Gun control: Allowing people to own guns increases public safety.

Strongly disagree Neutral Strongly agree

Gun control: Prohibiting gun ownership increases the possibility of excessive government control.

Strongly disagree Neutral Strongly agree

[Condition 1]

[The following instruction screens accompanied stimulus condition 1: local issue/high efficacy.]

ADVOCACY AD

The following advocacy advertisement asks you to support an organization fighting for the passage of specific proposed environmental legislation.

NEW ENVIRONMENTAL LEGISLATION

Pennsylvania state lawmakers are currently considering legislation to protect air quality in the Happy Valley area.
IT WILL BE 90% EFFECTIVE
Because this environmental legislation is among the most aggressive and comprehensive in the US, the PA Department of Environmental Protection and local environmental groups have reported it will be 90% effective in successfully reducing the emissions that threaten local air quality.
+++++
FOLLOWING THE AD
After viewing the advertisement, you will be asked for your opinions and attitudes about the message, the proposed legislation and the sponsoring advocacy organization.
+++++
CLICK CONTINUE ONLY ONCE
Please put on your earphones and click continue when you are ready to view the ad. The ad will take 10-12 seconds to load; please click continue only once, the video will start in a few moments.
+++++
[Stimulus video 1]
+++++
You will now be asked some questions about your attitudes and opinions toward the ad and the issue it addressed.
+++++
[Condition 2]
+++++
[The following instruction screens accompanied stimulus condition 2: local issue/low efficacy.]  
+++++
ADVOCACY AD
The following advocacy advertisement asks you to support an organization fighting for the passage of specific proposed environmental legislation.
+++++
NEW ENVIRONMENTAL LEGISLATION
Pennsylvania state lawmakers are currently considering legislation to protect air quality in the Happy Valley area.
+++++
IT WILL BE 10% EFFECTIVE
Because of significant additional truck traffic moving through the area on the soon-to-be-completed Interstate 99 highway, the PA Department of Environmental Protection and local environmental groups have reported the new law will only be 10% effective in successfully reducing the emissions that threaten local air quality.
+++++
FOLLOWING THE AD
After viewing the advertisement, you will be asked for your opinions and attitudes about the message, the proposed legislation and the sponsoring advocacy organization.
+++++
CLICK CONTINUE ONLY ONCE
Please put on your earphones and click continue when you are ready to view the ad. The ad will take 10-12 seconds to load; please click continue only once, the video will start in a few moments.

[Stimulus video 2]

You will now be asked some questions about your attitudes and opinions toward the ad and the issue it addressed.

[Condition 3]

[The following instruction screens accompanied stimulus condition 3: global issue/high efficacy.]

ADVOCACY AD
The following advocacy advertisement asks you to support an organization fighting for the passage of a specific proposed environmental treaty.

NEW ENVIRONMENTAL TREATY
Nations participating in the upcoming Copenhagen Climate Council are considering a treaty to prevent global warming.

IT WILL BE 90% EFFECTIVE
Because the developing nations of China, India and Brazil have signaled their intent to abide by the terms of the treaty, the US Environmental Protection Agency and global environmental groups have reported the treaty will be 90% effective in successfully reducing the emissions that cause global warming.

FOLLOWING THE AD
After viewing the advertisement, you will be asked for your opinions and attitudes about the message, the proposed treaty and the sponsoring advocacy organization.

CLICK CONTINUE ONLY ONCE
Please put on your earphones and click continue when you are ready to view the ad. The ad will take 10-12 seconds to load; please click continue only one, the video will start in a few moments.

[Stimulus video 3]

You will now be asked some questions about your attitudes and opinions toward the ad and the issue it addressed.

[Condition 4]
[The following instruction screens accompanied stimulus condition 4: global issue/low efficacy.]
+++++
ADVOCACY AD
The following advocacy advertisement asks you to support an organization fighting for the passage of a specific proposed environmental treaty.
+++++
NEW ENVIRONMENTAL TREATY
Nations participating in the upcoming Copenhagen Climate Council are considering a treaty to prevent global warming.
+++++
IT WILL BE 10% EFFECTIVE
Because the developing nations of China, India and Brazil have NOT signaled their intent to abide by the terms of the treaty, the US Environmental Protection Agency and global environmental groups have reported the treaty will only be 10% effective in successfully reducing the emissions that cause global warming.
+++++
FOLLOWING THE AD
After viewing the advertisement, you will be asked for your opinions and attitudes about the message, the proposed treaty and the sponsoring advocacy organization.
+++++
CLICK CONTINUE ONLY ONCE
Please put on your earphones and click continue when you are ready to view the ad. The ad will take 10-12 seconds to load; please click continue only one, the video will start in a few moments.
+++++
[Stimulus video 4]
+++++
You will now be asked some questions about your attitudes and opinions toward the ad and the issue it addressed.
+++++
[Cognitive response]
+++++
Please write down up to 5 thoughts / feelings you had when you watched this environmental advocacy advertisement. State your thoughts and ideas as concisely as possible. A phrase is sufficient. Ignore spelling, grammar, and punctuation. Use the enter (return) key to separate your thoughts. Please take 2-3 minutes to do this. [Text entry box provided.]
+++++
[Prior knowledge and support for environmentalism]
+++++
Please indicate how knowledgeable you were about/with the environmental issue addressed in the ad before you saw the ad.

1    2    3    4    5    6    7
Not  Neutral  Very
knowledgeable

Please indicate how familiar you were about/with the environmental issue addressed in the ad before you saw the ad.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not familiar</td>
<td>Neutral</td>
<td>Very familiar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please indicate how supportive you have been toward environmental issues in general before you saw the ad.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supportive</td>
<td>Neutral</td>
<td>Very supportive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please indicate how involved you have been toward environmental issues in general before you saw the ad.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not involved</td>
<td>Neutral</td>
<td>Very involved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Perceived processing level]

While watching this ad, how would you characterize your level of attention?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not involved</td>
<td>Neutral</td>
<td>Very involved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

While watching this ad, how would you characterize your level of attention?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrating very little</td>
<td>Neutral</td>
<td>Concentrating very hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

While watching this ad, how would you characterize your level of attention?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>
Paying little attention | Neutral | Paying a lot of attention |

I carefully considered the claims made about the issue presented:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninformative</td>
<td>Neutral</td>
<td>Informative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Not clear  Neutral  Clear
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Not complete  Neutral  Complete
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Meaningless  Neutral  Meaningful
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Boring  Neutral  Interesting
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Unappealing  Neutral  Appealing
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Unattractive  Neutral  Attractive
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Not likeable  Neutral  Likeable
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Not at all persuasive  Neutral  Persuasive
+++++

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1  2  3  4  5  6  7
Not at all  Neutral  Effective

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1 2 3 4 5 6 7
Not at all convincing Neutral Convincing

Please indicate your overall evaluation of the ad by clicking on the appropriate number. The ad is:

1 2 3 4 5 6 7
Weak Neutral Strong

[Ad credibility]

Please rate your assessment of the information contained in the ad by clicking on the appropriate number:

1 2 3 4 5 6 7
Not at all believable Neutral Believable

Please rate your assessment of the information contained in the ad by clicking on the appropriate number:

1 2 3 4 5 6 7
Not at all true Neutral Absolutely true

Please rate your assessment of the information contained in the ad by clicking on the appropriate number:

1 2 3 4 5 6 7
Not at all acceptable Neutral Totally acceptable

Please rate your assessment of the information contained in the ad by clicking on the appropriate number:

1 2 3 4 5 6 7
Not at all credible Neutral Very credible

[Negative affect]

Please indicate the extent to which the message in the ad made you feel afraid.

1 2 3 4 5 6 7
Not at all Neutral A lot
+++++
Please indicate the extent to which the message in the ad made you feel tense.
1 2 3 4 5 6 7
Not at all Neutral A lot
+++++
Please indicate the extent to which the message in the ad made you feel nervous.
1 2 3 4 5 6 7
Not at all Neutral A lot
+++++
Please indicate the extent to which the message in the ad made you feel anxious.
1 2 3 4 5 6 7
Not at all Neutral A lot
+++++
Please indicate the extent to which the message in the ad made you feel uncomfortable.
1 2 3 4 5 6 7
Not at all Neutral A lot
+++++
[Attitude toward the behavior and behavioral intentions]
+++++
Now we would like to ask a few questions about your attitude toward the action being advocated in the ad and the sponsoring organization.
+++++
To what degree do you personally support the goals of the advocacy organization sponsoring the ad?
1 2 3 4 5 6 7
Do not support Neutral Strongly support
+++++
To what degree do you personally agree with the goals of the advocacy organization sponsoring the ad?
1 2 3 4 5 6 7
Do not agree Neutral Strongly agree
+++++
What's the likelihood that you would search for more information related to the advocacy organization sponsoring the ad?
1 2 3 4 5 6 7
Not likely Neutral Likely
+++++
What's the likelihood that, if asked, you would sign a petition supporting the goals of the advocacy organization sponsoring the ad?
1 2 3 4 5 6 7
Not likely Neutral Likely
What's the likelihood that, if asked, you would write an email to a public official supporting the goals of the advocacy organization sponsoring the ad?

1 2 3 4 5 6 7
Not likely Neutral Likely
+++++

What's the likelihood that, if asked, you would donate money to support the goals of advocacy organization sponsoring the ad?

1 2 3 4 5 6 7
Not likely Neutral Likely
+++++

What's the likelihood that, if asked, you would donate time to support the goals of the advocacy organization sponsoring the ad?

1 2 3 4 5 6 7
Not likely Neutral Likely
+++++

[Manipulation check for local conditions 1 and 2]
+++++

What type of issue was did the ad address?

1 2 3 4 5 6 7
Local Global
+++++

Based on the ad you have read, how much do you agree or disagree with the following statement.

Photochemical smog in Happy Valley will be difficult to prevent.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree
+++++

Based on the ad you have read, how much do you agree or disagree with the following statement.

Enforcement of stricter local emissions standards can prevent photochemical smog in Happy Valley.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree
+++++

Based on the ad you have read, how much do you agree or disagree with the following statement.

Photochemical smog in Happy Valley is preventable.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree
+++++

[Manipulation check for global conditions 3 and 4]
+++++

What type of issue was did the ad address?
Based on the ad you have read, how much do you agree or disagree with the following statement.

Global warming is preventable.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

Based on the ad you have read, how much do you agree or disagree with the following statement.

Enforcement of stricter global emissions standards can prevent global warming.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

Based on the ad you have read, how much do you agree or disagree with the following statement.

Global warming will be difficult to prevent.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

[Perceived idealistic construal]

Finally, we would like to ask a few questions about your feelings toward the issue raised in the ad and the views you have expressed.

For you personally, how pleasurable would it be to take the action advocated in the ad?

1 2 3 4 5 6 7
Not at all pleasurable Neutral Very pleasurable

For you personally, how painful would it be to NOT take the action advocated in the ad?

1 2 3 4 5 6 7
Not at all painful Neutral Very painful

[The following nine items were presented in random order.]

My support for this advocacy organization expresses my true self.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree

My support for this advocacy organization stands up for my beliefs.

1 2 3 4 5 6 7
Strongly disagree Neutral Strongly agree
+++++
My support for this advocacy organization places values and principles above all other considerations.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>4</td>
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<td>6</td>
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<td>7</td>
<td></td>
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</tbody>
</table>

+++++
My support for this advocacy organization is action oriented.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>4</td>
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<td>6</td>
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<td>7</td>
<td></td>
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</tbody>
</table>

+++++
My support for this advocacy organization maximizes my self interest.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>4</td>
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<td>6</td>
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<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+++++
My support for this advocacy organization is money oriented.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>4</td>
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<td>6</td>
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<tr>
<td>7</td>
<td></td>
<td></td>
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</tbody>
</table>

+++++
My support for this advocacy organization takes advantage of an opportunity given the situation.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+++++
My support for this advocacy organization is self-fulfilling.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+++++
My support for this advocacy organization contributes to the community.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>4</td>
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<td>6</td>
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<tr>
<td>7</td>
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</tr>
</tbody>
</table>

[End]
**Appendix C**

**Comparison of mediating and dependent variable means by factor**

Cell means and (standard deviations) for mediating and dependent variables by high and low efficacy condition and high and low distance condition

<table>
<thead>
<tr>
<th>Mediating Variable</th>
<th>Efficacy Condition</th>
<th>Distance Condition</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>High</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Perceived Efficacy</td>
<td>Low</td>
<td>4.81</td>
<td>5.02</td>
<td>4.91</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.11)</td>
<td>(1.03)</td>
<td>(1.07)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>4.85</td>
<td>5.35</td>
<td>5.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.10)</td>
<td>(1.16)</td>
<td>(1.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.83</td>
<td>5.18</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.10)</td>
<td>(1.10)</td>
<td>(1.11)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constrained Idealism</td>
<td>Low</td>
<td>4.45</td>
<td>4.47</td>
<td>4.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.16)</td>
<td>(0.86)</td>
<td>(1.01)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>4.50</td>
<td>4.64</td>
<td>4.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.23)</td>
<td>(1.34)</td>
<td>(1.28)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.48</td>
<td>4.56</td>
<td>4.52</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.19)</td>
<td>(1.12)</td>
<td>(1.15)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Efficacy Condition</th>
<th>Distance Condition</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward the behavior</td>
<td>Low</td>
<td>4.72</td>
<td>4.96</td>
<td>4.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.55)</td>
<td>(1.09)</td>
<td>(1.34)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>4.99</td>
<td>5.16</td>
<td>5.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.25)</td>
<td>(1.38)</td>
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<td>(1.47)</td>
<td>(1.61)</td>
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<td>(1.45)</td>
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</table>
Vita
Lee Ahern

Academic Background
2008 Ph.D., The Pennsylvania State University, College of Communications
1987 Master’s Degree in Journalism, University of Wisconsin-Madison
1986 Bachelor’s Degree in Journalism, University of Wisconsin-Madison
1982 Bachelor’s Degree in Economics, University of Wisconsin-Madison

Teaching
Spring 2008 Introduction to Advertising (PSU COMM 320)
Fall 2007 Introduction to Advertising (PSU COMM 320)
Spring 2007 Public Relations Methods (PSU COMM 471)
Fall 2006 Public Relations Methods (PSU COMM 471)

Professional Experience
Abbey Lane Marketing, Inc., Gainesville, FL, Co-President, 1997 to 2002
Citibank NA, Stamford, CT, Assistant Vice President, Corporate Banking, 1996 to 1997
The Bank of New York, NYC, Assistant Vice President, BNY Brokerage, Inc. 1993 to 1996
The Bank of New York, NYC, Assistant Treasurer, Human Resources, 1990 to 1993
Dean Witter Reynolds, Inc., NYC, Publications Editor, 1989 to 1990
Magazine Publishers of America, NYC, Communications Manager, 1987 to 1989

Conference Papers
PRSA, October 2007
Reconstructing Ivy Lee: A postmodern man in the age of reform – Paper accepted for presentation at Betsy Plank Graduate Research Competition
AEJMC, August 2007
Media bias in the eye of the beholder: Issue importance, issue support and political identity – Paper accepted for presentation by the AEJMC Mass Communications and Society Division
AEJMC, August 2008
Communicating the risks of Fetal Alcohol Spectrum Disorder: Effects of message framing and exemplification – Paper accepted for presentation by the AEJMC Science Communication Interest Group

Recognition and Awards
Betsy Plank Top Graduate Student Paper Award
Public Relations Society of America International Conference, Philadelphia, PA, October 20, 2007