

## ABSTRACT

Title of Document: EVALUATING THE RELATIVE EFFECTIVENESS OF UTILITARIAN AND EXISTENCE VALUE APPEALS FOR PROMOTING ECOCENTRIC CONCERN AND PRO-ENVIRONMENTAL BEHAVIOR

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Pro-environmental behavior has been linked in many studies to attachment to the natural world, often conceptualized as ecocentrism. The current study sought to explore the ways in which environmental PSAs employing an existence value—as opposed to a utilitarian (usually cost-based)—frame, might contribute to a more ecocentric mindset. Secondary goals of the study were to determine whether existence value frames might positively influence intention toward conducting pro-environmental behaviors, as well as whether those who are more egoistically oriented might be more receptive to utilitarian messages. The experimental approach presented participants with a randomly selected pro-environmental PSA representing either an existence value or utilitarian frame. Results from the main study indicate that a utilitarian frame can have a negative impact on both ecocentrism and pro-environmental behavioral intention, and that high-egoism participants were not more persuaded by utilitarian approaches.

EVALUATING THE RELATIVE EFFECTIVENESS OF UTILITARIAN AND  
EXISTENCE VALUE APPEALS FOR PROMOTING ECOCENTRIC CONCERN  
AND PRO-ENVIRONMENTAL BEHAVIOR

By

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## Dedication

For Joe, Foster, and Sadie  
Thanks so much for all of your patience and support!

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## Chapter 1: Introduction

Environmental organizations are often faced with the daunting task of trying to influence the behavior of a large segment of the population. Whether they are promoting energy conservation, organic lawn care, forest conservation, or protection of wetlands threatened by development, these groups must choose messages that will both capture the attention of the public and provide inspiration for individuals to adopt pro-environmental behaviors. In order to accomplish this task, some groups have turned to a consumer-oriented, utilitarian frame that emphasizes the tangible benefits that can accrue from environmentally sensitive actions. This type of message is well-illustrated by the mid-1990s “Save the Crabs, Then Eat ‘Em” campaign sponsored by the Chesapeake Bay Foundation. Others, which are somewhat less common, appeal to the existence value of nature, attempting to resonate with an underlying spiritual, emotional, or otherwise personal connection to the intangible benefits of the natural world; this type of frame is perhaps most famously represented by Keep America Beautiful’s 1970s “Crying Indian” public service campaign.

Utilitarian value is defined for the purposes of this study as concern with anthropocentric benefits, wherein “effects on the ecosphere are valued in terms of their ultimate effects on humanity” (Tietenberg, 1992, p. 22). In contrast, existence value, while by necessity defined by a human perception, represents the intrinsic value of nature, apart from any tangible benefits accruing to mankind. In its purest form existence value is a reflection of the individual’s “satisfaction from just knowing that some particular ecosystem exists in a relatively undisturbed state” (Wilson, 1988, p. 219). The concept of existence value is closely linked to sociobiologist E.O. Wilson’s biophilia

hypothesis, which he describes as an instinctual connection to the natural world based in our evolutionary history, "...a sense of genetic unity, kinship, and deep history are among the values that bond us to the living environment" (2002, p. 133). It is to this (postulated) primal concern for the well-being of the natural world that existence value messages strive to appeal.

It has been suggested (Schultz & Zelezny, 2003) that utilitarian arguments, by appealing to the "least common denominator" (p.8), will be most effective in convincing the largest number of people to undertake pro-environmental behaviors. However, some (e.g., Osbaldiston & Sheldon, 2003; World Wildlife Fund-UK, 2009) have argued that enduring change and "positive spillover," in which adoption of one type of pro-environmental behavior leads to adoption of other pro-environmental behaviors, are most likely when arguments are used that appeal to something more deeply felt than mere consumer and other egoistically based values. Existence value frames, if truly effective in promoting this type of general environmental ethic, would allow environmental groups to move beyond a single-issue, scattershot approach to inspiring public support of environmental issues, to a more holistic, ecocentric approach that would allow them to maximize limited financial resources by increasing environmentally responsible behavior on multiple issues with each (ostensibly) single-issue campaign.

Given the magnitude and wide range of the environmental issues facing us today, from polluted waterways and urban sprawl to looming species extinctions and global warming, it is particularly relevant to consider both the short- and long-term implications of frame when designing environmental communication campaigns. The current study therefore sought to explore the relative effectiveness of utilitarian and existence value



frames for promoting both pro-environmental behavioral intention and a more ecocentric mindset. It is hoped that the study's findings can contribute to a research-based approach to conducting outreach for environmental causes.

### **Conceptualization**

When seeking to encourage adoption of pro-environmental behavior, it seems prudent to examine the underlying basis of environmental concern. One way to understand the motivation of those who are consciously committed to environmental sustainability is provided by the concept of the New Ecological Paradigm (NEP; Dunlap, Van Liere, Mertig & Jones, 2000; Dunlap & Van Liere, 1978). Adherents to the NEP are strongly guided by a belief in protecting nature for its own sake, supporting environmental protection even at the expense of economic development. In contrast, the Dominant Social Paradigm (DSP) reflects a “belief in growth, limitless resources, private property rights, and technological salvation” (Cantrill, 1993, p. 74). Kempton, Boster and Hartley (1995) discovered widespread acceptance of many of the facets of the NEP in a large-scale study of environmental attitudes in the United States. Through a national survey, these researchers uncovered three basic motivations to protect the environment, which they categorized as “religious/spiritual,” “utilitarian,” and “biocentric” (valuing nature for its own sake, also commonly referred to as “ecocentric”). Of special interest to the proposed study, Kempton et al. suggest that the tendency of environmental groups to frame issues in terms of utilitarian arguments (e.g., economic cost) may represent a missed opportunity, since the only “utilitarian” value they found to have “real emotional force” (p. 223) was preserving the earth for future generations. In this conceptualization, existence value frames might therefore be classified as either religious/spiritual or

biocentric (or both or neither), depending on the type of connection the message recipient holds (or fails to hold) for the natural world.

Cantrill (1993) has also commented on the propensity of many environmental organizations to use the Dominant Social Paradigm (DSP) language of scientific fact and economic benefits when speaking publicly on behalf of their causes; he speculates that this habit may be unwittingly reinforcing a general cultural acceptance of the DSP as the “correct” framework for societal decision-making. Following on Cantrill’s thoughts, this study seeks to investigate whether utilitarian value frames for environmental causes may in fact contribute to the perpetuation of a cultural bias to devalue the natural world by monetizing or otherwise reducing it to a resource existing only for human use, transmitting the undoubtedly unintended message that the protection of nature is not inherently important. Conversely, and of primary interest for the proposed study, is whether the use of existence value frames might challenge the DSP and lend credibility to the NEP as a valid justification for activities that protect the environment. In other words, might the use of the language of the NEP, particularly if it became the dominant language for discussion of environmental issues, begin to break down the DSP, by encouraging people to consider matters of environmental concern in terms of the inherent value of nature rather than from a utilitarian perspective? The current study is intended to begin to address this question.

### **Emotional or Rational?**

Two of the most widely cited models in the persuasion literature, both of which are frequently applied to the design of communication campaigns, concern the relative effectiveness of logical arguments versus less “rationally” based appeals. The Elaboration

Likelihood Model (ELM; Petty & Cacioppo, 1986) and the Heuristic Systematic Model (HSM; Chaiken, 1980) both differentiate between two major modes of information processing: (1) cognitive, considered the “central route” in the ELM and “systematic processing” in the HSM; and (2) “peripheral” (ELM) or “heuristic” (HSM) processing, in which non-cognitive short-cuts determine receptivity to a given message, such as considering the number of arguments put forward rather than the quality of the reasoning used. Those who are more involved with a message are more likely to process via the central route (Petty & Caccioppo, 1979), and, as Petty, Haugtvedt and Smith (1995) have reported, if the recipient considers the arguments in the message to be convincing, central route processing is more likely to create a lasting change in an individual’s attitudes or behavior.

The ELM and HSM provide a strong theoretical framework for considering the merits of various types of persuasive appeals, suggesting that for enduring change in attitudes and behavior, it is preferable to engage the audience in central (or systematic) processing. However, while logical arguments clearly fall into the “cognitive” category, neither model specifically addresses the cognitive impacts of messages that appeal to deeply held *values*, such as might be used in environmental PSAs that appeal to the existence value of nature. Such emotional resonance might well be expected to influence the degree of the message recipient’s personal involvement with the issue, thus (as per the ELM) making the individual more likely to centrally process information on that issue. While many types of emotional appeals have been thoroughly examined in the persuasion literature, including fear (e.g., Miller & Hewgill, 1966; Witte, 1992), guilt (e.g., Pinto & Priest, 1991; Coulter & Pinto, 1995), anger (Turner, 2007) and “warmth”

(Aaker, Stayman & Hagerty, 1986), arguments based in emotional *connection* and deeply held values, perhaps owing to their relative rarity, have not been evaluated as a distinct category of persuasive appeal.

The presumption of a clear dichotomy between “cognitive” and “emotional” messages is widespread in Western forms of communication, but it is not undisputed. Damasio’s (1994) treatise on the overlapping nature of reason and emotion is frequently cited by those questioning such a clear distinction between our “cognitive” and emotional faculties. In his analysis of the neurological connections between reason and emotion, he discusses the ways in which emotions often (unconsciously) underlie our “reasoned” responses, and argues that “reason may not be as pure as many of us think or wish it were...emotions and feelings may not be intruders in the bastion of reason at all: they may be enmeshed in its networks, for worse *and* for better” (p. xii, emphasis in original). Zajonc (1980) has also commented on the murky dividing line between feelings and thoughts, observing that “there are probably very few perceptions and cognitions in everyday life that do not have a significant affective component” (p. 153). Similarly, Nabi (2003) has noted that emotions are key to decision-making, actually driving cognitive processes. And environmental anthropologist Kay Milton (2002) has drawn a similar conclusion with her observation that “arguments will only have force if we feel them.” She goes on, “arguments motivate in the same way as other things motivate. Like the sight of a beautiful landscape, or a child or animal in distress, they motivate by inducing emotions which generate feelings. Without grasping this, we cannot understand how or why arguments persuade or fail to do so” (p. 100). The proposed study is thus

based on a conceptualization of emotions not as heuristics or temporary moods, but as potential channels for motivating conscious commitment to pro-environmental behavior.

### **Purpose of Study**

The focus of this experimental study is to judge the relative effectiveness of what might be considered two types of cognitive appeals common to environmental PSAs: logical reasoning (the utilitarian approach) and emotional connection (the existence value approach). The experiment exposed participants to environmental PSAs typifying either utilitarian or existence value frames, to evaluate the impact of each on ecocentric orientation with regard to environmental issues in general, as well as on pro-environmental behavioral intent.

### **Rationale**

Although the concept of biocentrism/ecocentrism<sup>1</sup> has been extensively studied in the field of environmental psychology (as discussed in the following literature review), it is typically considered as an independent variable predictive of pro-environmental behavior. While a small number of studies has evaluated ecocentrism as a dependent variable, especially with regard to how encouraging feelings of empathy can increase the expression of ecocentrism (Allen & Ferrand, 1999; Schultz, 2000; Sevillano, Aragonés & Schultz, 2007; Berenguer, 2007, 2010), there has been scant published literature regarding the potential to encourage (or discourage) ecocentric concern in the context of PSAs and other advocacy messages. In addition, while communication scholars have generated a sizable body of work focused on the impacts of framing in both news and advocacy messages, this research has not yet been merged with an understanding of

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<sup>1</sup> The terms “biocentrism” and “ecocentrism” (and “biocentric” and “ecocentric”) are used preferentially by different schools of research. The terms however are synonymous, and will be used interchangeably throughout this paper except when referring to specific research studies.

ecocentrism and other value orientations from the environmental psychology literature. Therefore, this study attempts to join the insights from environmental psychology regarding motivation for pro-environmental behavior, together with an understanding of the possible influence that various communication approaches might have on an individual's thoughts and feelings about environmental issues. This study thus endeavors to fill an important gap in the fields of both environmental psychology and communication, by applying highly pertinent information from these two related but generally segregated disciplines to a pressing societal challenge: understanding how to engender meaningful and durable commitment to perform environmentally responsible behavior.

## Chapter 2: Literature Review

The following literature review will first provide an overview of the large body of research, mainly from the environmental psychology field, regarding what motivates people to behave in an environmentally responsible manner. This discussion will place special emphasis on value orientations, typically classified as egoistic, altruistic and biocentric/ecocentric, with particular attention to the potentially emotional basis of deeply held environmental concern and its association with consistent commitment to pro-environmental behavior. I will then turn to research on framing from communication, journalism, and political science, to consider the way in which the use of certain frames can influence an individual's reliance on specific types of values when formulating opinions and making decisions.

### **Motivation for Environmentally Responsible Behavior**

Environmentally responsible behavior has been operationalized in a variety of ways across a plethora of studies. Researchers have measured behavioral intent and recorded actual behavior for activities ranging from composting and recycling to donating money to environmental groups and making voting decisions based on environmental concerns. Stern, Dietz, Abel, Guagnano, and Kalof (1999) have provided a helpful schema for categorizing pro-environmental behaviors, distinguishing not only activist behavior from other types of support for environmental protection, but also between "private-sphere" actions such as consumer behaviors and support for public policies and more public "environmental citizenship" actions such as voting and contacting elected representatives (p. 91).

Many researchers (e.g., Stern, 2000; Poortinga, Steg & Vlek, 2004; Kollmus & Agyeman, 2002; Thøgersen & Ölander, 2006) have noted the difficulty of gauging motivation for pro-environmental behaviors, especially private-sphere consumer behaviors, because of the existence of constraints that may vary depending on an individual's socio-economic status or even their place of residence (e.g., inability to purchase organic products, inaccessibility of public transportation options). These issues of context can confound measurement of the factors that may motivate people to act environmentally responsibly, since even those who are highly motivated to behave pro-environmentally may not be able to do so, given significant infrastructural constraints, and even those not at all motivated to behave pro-environmentally may do so if external conditions make it more convenient, for example, than acting non-environmentally (see Corraliza & Berenguer, 2000 for an analysis of the impacts of situational factors). Despite these challenges, consumer behaviors have been found to be positively correlated with each other when external constraints are considered (Kaiser, 1998); they have also been found to be correlated with policy support and environmental citizenship actions (Karp, 1996; Stern, Dietz, Abel, Guagnano & Kalof, 1999).<sup>2</sup> However, in order to avoid the measurement challenges presented by pro-environmental consumer behaviors, the current study focuses on measuring intention regarding environmental citizenship behaviors (e.g., voting, donating) and policy support, rather than to those behaviors more prone to influence by external constraints. In addition, in the main study, participants were also asked to indicate their behavioral intention with regard to energy conservation, the specific behavior addressed by the PSAs.

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<sup>2</sup> Activist behaviors such as participating in protests appear to be very weakly if at all correlated with non-activist behaviors other than environmental citizenship (Stern et al., 1999; and as summarized by Dono, Webb & Richardson, 2010).



The past quarter-century has witnessed a tremendous effort on the part of environmental psychologists to understand the underlying basis of pro-environmental behavior. Early researchers in the field concluded that knowledge about environmental issues is not generally a reliable predictor of pro-environmental behavior (e.g., Moore, Murphy & Watson, 1994; Kempton et al., 1995; Monroe, 2003), and that while correlations are frequently observed with demographic characteristics such as age, sex, level of education (e.g., Stern, Dietz & Kalof, 1993; Dietz, Stern & Guagnano, 1998; Stern et al., 1999; Schultz & Zelezny, 1998; Zelezny, Chua & Adrich, 2000), and political orientation (e.g., Dunlap, Van Liere, Mertig & Jones, 2000); these factors are not generally considered to be causative predictors of environmentally responsible actions.

Numerous studies have sought to provide better explanations of why some people adopt pro-environmental behaviors, by examining the relationship between attitudes and environmental behavior. This research has typically been conducted in the context of Fishbein and Ajzen's Theory of Reasoned Action (TRA) (1975) and Ajzen's Theory of Planned Behavior (1991), both of which link intent to perform environmentally responsible actions to environmental attitudes and perceived social norms. The TPB differs in adding perceived behavioral control to the model, which appears to be more effective when evaluating individuals' intentions to perform more effortful behaviors, such as composting (Taylor & Todd, 1997) or adoption of new water conservation technology by farmers (Lynne, Casey, Hodges & Rahmani, 1995). However, while behavioral intentions have been found to be closely related to environmentally responsible behavior, especially when perceived external constraints are not great, the

TRA/TPB studies fail to consider *why* certain people have more positive attitudes toward pro-environmental behaviors, as well as why some may choose to perform these behaviors, even when external constraints exist.

**Internal motivation.** Recent studies have moved beyond the solely “reasoned” approaches, seeking to better explain pro-environmental commitment. This research has frequently found that internal motivation is the most reliable predictor of an individual’s adoption of long-term behaviors intended to protect the environment. For example, De Groot and Steg (2010) found that study subjects who were “strongly intrinsically motivated” toward environmental protection were the most likely to choose to donate to an environmental cause, as opposed to a humanitarian organization. Further, De Young (2000) offers evidence from a group of studies that “intrinsic satisfaction” is a key benefit for those routinely participating in environmentally responsible activities such as recycling and reducing waste. He observes that effective environmental appeals must be directed at “the core of a person’s needs or concerns” (p. 514).

Although De Young’s definition for intrinsic satisfaction focuses on rewards associated with “competency” and frugality, Osbaldiston and Sheldon (2003) investigated another type of internal connection, finding that students who felt that pro-environmental behavior was important because personally valued were more likely than others to express interest in adopting sustained behavior change. The researchers note that “bribes and guilt do not help to create the type of high-quality motivation that will lead people to take increasing responsibility for their behavior and for the environmental health of the planet as a whole” (p. 350).

**Self concept.** Other researchers have examined internal motivation specifically based on identity, assessing how one's sense of self is connected to a specific environmental behavior or to protection of nature in general. For example, Castro et al. (2009) found that recycling behavior was significantly predicted by the degree to which an individual included recycling as "an important component of self-identity" (p. 31), and Whitmarsh and O'Neill (2010) have observed the same pattern for energy conservation behavior. Mannetti, Pierro and Livi (2004) added self-identity to the TPB, asking people to rank themselves on certain qualities (such as conscientiousness and sensitivity), as well as to rank those who "typically" perform a group of waste reduction activities on the same qualities. They found that perceived identity similarity to the typical waste reducer was the strongest predictor of behavior. Another group of researchers (Arnocky et al., 2007) have reported that "self-construal" is highly correlated with pro-environmental behavior; those who reported themselves to be connected to "all things"—as opposed to connection only to humankind, or to nothing beyond the self— were more concerned about the environment than the other two groups, and much more likely to report that they were in the habit of participating in pro-environmental behaviors.

Similarly, Dutcher, Luloff and Johnson (2007) examined the relationship between a feeling of connectivity with nature and pro-environmental values and behavior, affirming the intuitively appealing supposition that those who feel more strongly a part of nature, as well as that nature is a part of them, are more likely to value the natural world and behave in a way that they believe is protective of it. Davis, Green, and Reed (2009) assessed a similar concept. In a test of the connection of "inclusion of nature in self" to pro-environmental behavior, they asked participants to select among several Venn-like

diagrams depicting “self” and “nature” as two circles at varying degrees of overlap. As the researchers had expected, an increased sense of connection to nature was predictive of self-reports of pro-environmental behavior. In a companion experiment, these researchers also found that individuals asked to write about ways they felt “connected to the natural environment” were more likely to agree to participate in a future river cleanup than those instructed to write about things they did each day which have “no impact on the environment.”

**Emotional connection.** It should be pointed out that much of the environmental psychology literature, even in those studies that focus on internal motivation and “connectedness” to nature, has not explicitly attributed an emotional element to these factors, frequently categorizing them as “cognitive” phenomena (as noted by Vining & Ebreo, 2002). However, many researchers have uncovered a distinctly value-driven and often emotional basis for both connectedness to nature and environmentally responsible behavior.

In their study of Australian adults, Pooley and O’Connor (2000) reported that most of those surveyed attributed their concerns about logging of native forests and urban development primarily to affect rather than belief. Vining (1992) observed a similar quality in the U.S. public, in a survey of several community organizations (high school band booster club, bicycling club parochial school parents, and an environmental group). She found that opinions about whether to preserve or develop local forest areas were indistinguishable between the general public and environmental groups, and that the general public groups reported emotional intensity about their opinions at a statistically similar level to that reported by members of the environmental group (although the

environmental group reported somewhat higher levels of anger and distress). In open-ended responses, general public members were similarly likely to use “value-laden” terms to describe their thoughts about forest management options as those from the environmental group; one member of the general public compared clear-cutting of a forest to “murder” (p. 20). A related follow-up study (Vining & Tyler, 1999), a content analysis of public responses to proposed forest management plans, also found evidence of the generally emotional nature of concerns about preserving natural places. Also in a series of interview studies, Dwyer, Schroeder and Gobster (1991) observed clear signs of a strong attachment between city dwellers and urban forests, reporting that “there are deep emotional ties between people and trees” (p. 276), and concluding, “the values mentioned in this paper tend to evoke emotional rather than rational arguments for tree preservation” (p. 283).

Striving to measure this type of feeling, Kals, Schumacher, and Montada (1999) developed the concept of “emotional affinity” for nature, which they define as love for and/or feeling of “oneness with” nature, distinct from a scientific “interest” in the natural world. Their survey found that private environmental behaviors (such as water conservation) were most strongly motivated by an emotional affinity for nature. These findings were further validated by Nisbet, Zelenski and Murphy (2009), who offer a “nature relatedness scale” to measure affective, cognitive, and experiential connections to nature. They confirmed that nature relatedness was positively correlated with pro-environmental behavior, including membership in environmental organizations, sustainable lifestyle choices, and self-identification with the environmental movement, and was a better predictor of these factors than similar scales that omit emotions. The

researchers speculate that a “personal relationship” with nature can be an important motivating force. This idea is further shared by Perkins (2010), whose “love and care for nature” scale, when compared to scales that seek to measure environmental commitment without an explicit emotional component, was a more accurate predictor of both the frequency of (self-reported) pro-environmental behavior, and of willingness to undertake such behavior when doing so requires personal sacrifice.

Another indication of the potentially motivating power of emotions is the link found by many studies between pro-environmental intentions and the ability to understand the feelings of others. Allen and Ferrand (1999) found a positive correlation between individuals’ levels of sympathy for others and their reports of pro-environmental behaviors, suggesting that more sympathetic people are likely to extend their capacity for sympathy to the natural world. Other researchers have specifically examined empathy for the natural world and its influence on pro-environmental sentiments by inducing empathy in participants. Schultz (2000) showed research participants slides picturing animals harmed by pollution, and asked them to either remain objective or to focus on each animal’s feelings. Those asked to empathize in this manner reported higher levels of “biospheric environmental concern”, defined as concern based on value for all living things. In a similar experiment, Sevillano, Aragonés and Schultz (2007) found that those who were asked to consciously take the perspective of animals appearing to be in distress in a series of slides subsequently reported a higher level of concern for plants, animals and birds. Berenguer (2007, 2010) had comparable results in a series of studies designed to induce empathy for the natural world. In the first of these studies (2007), he found that individuals who were primed to be more empathetic toward natural objects (birds or

trees) in pictures reported a more positive attitude toward nature, as well as support for a greater allocation of their university's outreach funds to nature protection. In a follow-up study (2010), research participants primed to feel empathy for a vulture were more likely to provide nature-centered and moralistic reasons for protecting the environment than those primed to feel empathy for a young man. These studies appear to support the conclusion of Dutcher et al. (2007), who argue that connectivity to nature is likely related to empathy, since both reflect a sense of unity between self and nature.

**Sacred bond.** Dutcher et al. (2007) have speculated that “as experienced...connectivity may be an essentially spiritual phenomenon” (p. 490), and many studies of pro-environmental sentiment and behavior have perceived the connection between self and nature as a spiritual one. In exploring the sacred bond many individuals appear to share with the natural world, Schroeder (1992) defines the connection thus: “‘Spiritual’ refers to the experience of being related to or in touch with an ‘other’ that transcends one’s individual sense of self and gives meaning to one’s life at a deeper than intellectual level” (p. 25).

Murphy (1999) observed this spiritual connection in a set of semi-structured interviews with twenty university students, in which he explored their individual interpretations of the concept of “wilderness.” He found that most of those interviewed rejected the idea of a utilitarian value for wilderness beyond spiritual and recreational benefits, and that most also explicitly connected their decision to recycle to the fact that they valued wilderness. Since recycling has at most only a tangential connection to one’s enjoyment of recreation in nature, it might therefore be surmised that their decision to recycle was based primarily on their “spiritual” value for wilderness. Similarly, Kempton,

Boster and Hartley (1995), in a massive survey study of U.S. adults, also found that people ascribed an often spiritual or otherwise non-materialistic value to nature. The same phenomenon was reported by Vining and Tyler (1999), who discovered ample evidence of “spiritual reverence or religious concerns” (p. 26) in their content analysis of public input on management plans for a national forest.

Stern, Dietz, Abel, Guagnano and Kalof (1999) also examined this spiritual connection, asking a sample of U.S. residents to describe their beliefs about the “sacredness” of nature. Respondents indicated whether they felt more that nature is sacred because it was “created by God”, that nature is “spiritual or sacred in itself”, or that “nature is important but not in a spiritual or sacred way” (pp. 87-88). The researchers found that those who felt that nature was sacred, for whatever reason, were more likely to report environmentally responsible consumer behavior. In addition, they found that only those who believed that nature was sacred in itself were more likely to engage in “environmental citizenship”, including membership in environmental organizations and non-activist political behavior such as voting for pro-environmental candidates and writing to elected representatives.

**Moral obligation.** Several studies have found that pro-environmental behavior is strongly correlated with an individual’s sense of moral obligation toward protection of the environment. Story and Forsyth (2008) surveyed residents in a Virginia community where a grassroots initiative was working to combat urban sprawl, finding that a sense of personal responsibility was a prime motivator for those who chose to support the effort. Two meta-analyses of motivations for pro-environmental behavior (Hines, Hungerford & Tomera, 1986/87; Bamberg & Möser, 2007) have also found moral obligation to be a



strong predictor of pro-environmental behaviors. In addition, the “personal norm” is a key component of the Value-Belief-Norm model (VBN), which provides the basis for a large number of studies seeking to explain environmentally responsible behavior. (The VBN and related studies are discussed in detail in the next section of this review.)

In one of the studies included in Bamberg and Moser’s (2007) meta-analysis, Kaiser and Shimoda (1999) sought to more clearly describe the sense of personal obligation that inspires some individuals to undertake pro-environmental behaviors. A survey of two groups involved in transportation issues in Switzerland – one focused on environmentally sound transportation alternatives, and one supporting the interests of automobile owners – revealed that moral responsibility, as opposed to “conventional” responsibility (responding to perceived social expectations), is the most common motivator behind pro-environmental behavior. Kaiser and Shimoda also differentiated between “feelings” of moral responsibility and “responsibility judgment,” the latter defined as a conscious decision to assign responsibility to oneself. While both of these expressions of moral responsibility were correlated with pro-environmental behavior in the study, and responsibility judgment was the strongest predictor of such behavior, the researchers interpreted the data to suggest that “people evaluate their personal responsibility after they already *feel* morally responsible” (p. 250; italics added). A related study (Kaiser, Ranney, Hartig & Bowler, 1999) also found that while environmental knowledge, values, and “responsibility feeling” (RF) were all predictive of environmental behavior intention (EBI), “only RF affected EBI directly in a significant way” (p. 68). These observations lend support to the idea that emotions may be an

important motivator for those engaged in environmentally responsible behavior, and that “moral responsibility” may be a reflection of emotional attachment to the natural world.

**Value orientations.** The preceding discussion has included a great variety of ideas about the factors that underlie pro-environmental behavior: internal motivation; compatibility with self concept; connectedness, emotional attachment, and a spiritual connection with the natural world; and a sense of moral responsibility for nature. However, it seems reasonable to conclude that these ideas all represent varying conceptualizations of the same basic phenomenon, which is described by individuals and/or researchers in disparate ways according to the subjective experience and/or particular bias of each. Furthermore, these phenomena, each of which has been linked by multiple studies to pro-environmental behavior, are addressed perhaps most comprehensively in the body of research focused on “value orientations,” first applied to predicting pro-environmental behavior by Stern and Dietz (1994). These studies include the concept of the “biospheric” value orientation (also referred to as “ecocentrism”), which reflects an individual’s perception of the importance of nature, whether they perceive that as a cognitive, emotional, moral or spiritual phenomenon.

Stern and Dietz (1994) derived their theory on value orientations from Schwartz’s (1977) norm activation model, which is concerned with social altruism. The norm activation model predicts that decisions to behave in an altruistic manner are determined by “personal moral norm,” which is in turn created by a combination of awareness of the consequences of harm to others and a feeling of moral responsibility to prevent such harm. Stern and Dietz adapted the norm activation model specifically for environmental values, creating the value-belief-norm theory (VBN). The VBN expands Schwartz’s

model to include other motivations beyond altruistic values; these values are thought to impact one's beliefs about environmental issues, which in turn influence one's feeling of obligation to behave in an environmentally responsible manner. Central to the VBN theory is the delineation of three basic "value orientations" —egoistic, social-altruistic, and biospheric (valuing nature for its own sake) — which are believed to underlie one's environmental concern for a given issue. All three orientations are postulated to co-exist, to varying degrees, in each individual, with the most salient ultimately driving a person's decision-making regarding intention to carry out pro-environmental behaviors.

In some early studies on value orientations, Stern and colleagues (Stern & Dietz, 1994; Stern, Dietz, Kalof & Guagnano, 1995) were unable to differentiate between the social-altruistic and biospheric orientations, speculating that perhaps a "clear distinction" did not yet exist in the U.S. general public between "valuing nature in itself and valuing nature because of the human benefits it provides" (Stern & Dietz, 1994, p.78). However, whether due to a more widespread emergence of a biospheric value orientation, or to improved ways of measuring it as a distinct value orientation,<sup>3</sup> several subsequent studies have repeatedly found the biospheric orientation to be both commonly held and to correlate significantly with pro-environmental behaviors. Initially, Karp (1996) used a factor analysis to elucidate the structure of Schwartz's values inventory in a group of U.S. undergraduates; he found that the environmental items in the inventory represented a grouping "distinct from other socially oriented values". Subsequently, Schultz (2000) employed confirmatory factor analysis to establish the existence of the biospheric value orientation in another group of university students in the United States; he had similar

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<sup>3</sup> Stern, Dietz, Kalof and Guagnano (1995, p. 1617) speculated that this failure to discern a distinct biospheric orientation in the general public may have been due to having included too few specifically biospheric items in their questionnaire.

findings in a sample of university students from ten countries, as well as in a sample of California residents (Schultz, 2001). Schultz (2001) argued that the three basic value orientations are reflective of the degree to which an individual includes other people and nature in their sense of self. Also of note is that although Schultz plainly labels this conception to be “cognitive” (p. 336), he compares the biospheric orientation to the closeness experienced in “an interpersonal relationship” (p. 336), which seems to suggest that an emotional element may be critical as well.

De Groot and Steg (2008) again empirically demonstrated the distinct nature of the biospheric value orientation using confirmatory factor analysis, based on survey data from the general population in the Netherlands, as well as in an Internet study of the public in five European nations. Data from Garling, Fujii, Garling, and Jakobsson (2003), Hansla, Gamble, Juliusson, and Garling (2008), and Sneglar (2006) also support the existence of a separate biospheric orientation in European samples. In addition, Sneglar’s (2006) exploratory component and factor analyses not only differentiated between the altruistic and biospheric orientations, but also identified a possible subdivision within the biospheric orientation, between values for plant and animal life. Interestingly, and in apparent direct contradiction to the early findings of Stern and colleagues (Stern & Dietz, 1994; Stern et al., 1995), she notes that while the data clearly support three (or possibly four) separate value orientations toward environmental issues, her data, based on a questionnaire study of students at a university in the United Kingdom, indicated that the altruistic orientation was more closely aligned to the egoistic than the biospheric value orientation(s).

While the point has been made that environmentally responsible actions can be motivated by egoistic, altruistic, or ecocentric factors (e.g., Stern, Dietz & Kalof, 1993; Stern, Dietz, Abel, Guagnano & Kalof, 1999; Bamberg & Möser, 2007), many researchers have shown the biospheric value orientation to be the most reliable predictor of pro-environmental behavior, especially when that behavior requires a greater degree of sacrifice (e.g., willingness to pay increased taxes versus recycling aluminum cans). For example, in two separate studies, De Groot and Steg (2008, 2010) found that the biospheric orientation was predictive of intention to donate to environmental causes as opposed to humanitarian organizations, while the altruistic orientation was negatively correlated with such intent. In addition, their findings indicated that egoism was negatively associated with intent to recycle, as well as with a general lack of concern for the environment overall. This example illustrates clearly the benefit of considering motivations for environmental protection based on the three value orientations – it is not, apparently, the simple existence of an appreciation for nature that makes one more willing to engage in pro-environmental behavior, but the strength of that “appreciation” when in comparison with other concerns. As De Groot and Steg (2008) observe, “when different competing values are activated in a specific situation, choices are based on values that are considered to be most relevant to act on” (p. 331).

In a survey of university students in the U.S., one European and three Latin American countries, Schultz and Zelezny (1998) confirmed a positive relationship between biospheric values (such as desiring “unity with nature” and “a world of beauty”) and self-reported recycling, use of public transportation, energy and water conservation, and green consumerism; this relationship was statistically significant in four of the five

countries studied. They also found a negative relationship between egoism (defined in part as placing a high value on power and achievement) and these pro-environmental behaviors in all five countries. In addition, Arnocky, Stroink and DeCicco (2007) found a similar connection between biospheric values and self-reported conservation behaviors in a sample of university students in Canada. These researchers reported that “biospheric environmental concern, when entered into a multiple regression with egoistic and altruistic concern mean scores, was the only environmental concern predictive of self-reported conservation behaviour” (p. 261).

Moving beyond intention and self-reports to actual behavior, Clark, Kotchen, and Moore (2003) based their study on participation in a voluntary “green electricity” program in Michigan. They surveyed people already enrolled in the program, as well as residents who did not enroll, to discern their motives for agreeing (or not agreeing) to pay an additional cost in order to contribute to environmental protection. They discovered that this pro-environmental behavior was motivated most frequently by ecocentrism, followed by altruism, and lastly by egoism. In addition, a survey study on recycling and other waste reduction behaviors among residents in three Illinois metropolitan areas (Ebreo & Vining, 2001) found that overall, participants ranked concerns about the environment (coined “environmental altruism” by the researchers), rather than economic or social issues, as most important in influencing their decisions to engage in pro-environmental behavior. And although they also used a different terminology, Thøgersen & Ölander (2006) concluded that those who possess a “general conservation stance” -- (a construct operationalized in part with survey questions used to define biospheric values in

many VBN studies) -- were more likely to report engaging in a wide range of pro-environmental behaviors.

A parallel line of research to the VBN provides further support for the idea that environmental concern based primarily on the inherent value of nature can be a powerful predictor of pro-environmental behavior. These studies, following on the initial work of Thompson and Barton (1994) (discussed below), also consider the values underlying environmental concern and behavior, but define these values as ecocentric versus anthropocentric, rather than dividing anthropocentric values into egoistic and altruistic components. This body of research also uses the term “ecocentrism” instead of “biospheric value orientation”, but, as explained by Kortenkamp and Moore (2001), both derive from the term “biocentric”, termed in the early 20<sup>th</sup>-century and adopted by deep ecologists in the 1970s to refer to the intrinsic value of all life (Nash, 1989). Also similar to the VBN, they include a sense of moral obligation toward nature as a key factor leading to pro-environmental behaviors.

Thompson and Barton (1994) postulated that there are “at least two motives or values (*ecocentric* and *anthropocentric*) that underlie support for environmental issues” (p. 149, italics in original). They compare their approach to that of Stern et al. (1993), explaining that anthropocentric values encompass both egoistic and social-altruistic, which “focus on outcomes for humans” (p. 150). They also define anthropocentric individuals as “utilitarian” in orientation, viewing nature as a resource for humans, while those with an ecocentric approach are driven by “moral consideration” for nature (p. 150). Their questionnaire studies of travelers at a Boston airport and students at a U.S. university confirmed their original thesis, that those who are ecocentrically motivated are

significantly more likely to engage in pro-environmental behavior. (Pro-environmental behavior in their study was measured via self-reports for both groups and, with the student group, observation of actual commitment to join a campus environmental organization.)

Thompson and Barton's sharp distinction between ecocentrism and anthropocentrism has been questioned by some researchers (Kortenkamp and Moore, 2001; Corral-Verdugo, Carrus, Bonnes, Moser & Sinha, 2008), who argue that the two value orientations are often compatible and that anthropocentric values can be important for motivating pro-environmental behavior, especially in cases where environmental issues are clearly linked to human welfare. However, several studies that have considered ecocentric values in comparison to anthropocentric values have drawn similar conclusions to Thompson and Barton, concluding that ecocentrism is a more reliable motivator for a range of pro-environmental behaviors. For example, in their survey of Swedish adults Nordlund and Garvill (2002) found that ecocentrism, but not anthropocentrism, related to a "personal moral norm" (a feeling of moral obligation toward environmental protection), which in turn had a strongly positive effect on reported pro-environmental behavior. They also found that anthropocentrism was negatively related not only to pro-environmental behaviors, but also to mere awareness of environmental problems. Grendstad and Wollebaek (1998) drew a compatible conclusion in their comparison study of the general public and "organized environmentalists" (those belonging to one or more environmental organizations) in Norway. They found a surprising degree of agreement between these two groups on ecocentric values, and



determined that “environment-friendly behavior correlates positively and significantly across the board with all aspects of ecocentrism” (p. 668).

Karpiak and Baril’s (2008) findings further validate the connection between ecocentrism and pro-environmental behavior. In a questionnaire study, they determined that ecocentrism was positively related to conservation behaviors and strongly negatively correlated with apathy, while anthropocentrism was positively related to environmental apathy and negatively related to conservation behaviors. They also found that ecocentrism was positively related to “principled moral reasoning”, while anthropocentrism was unrelated to this type of reasoning, and that “apathy” toward the environment correlated negatively with principled moral reasoning. These results suggest that an ecocentric orientation may be based largely in a sense of morality which extends to the natural world. In addition, the authors observe that “most of the ecocentrism items seem to reflect an emotional affinity toward nature” (p. 206), speculating that empathy is necessary for both advanced moral reasoning and an ecocentric worldview. Also of note is their observation that “cognitive justice orientation,” which the study sought to separate from emotional factors, was also positively correlated with ecocentrism. This may reflect a close pairing of the “cognitive” and the “emotional,” at least with respect to environmental attitudes.

As many of the studies discussed above indicate, not only do strong biospheric values appear to be most conducive to adoption and maintenance of pro-environmental behaviors, but egoistic values may actually dissuade people from making changes toward more sustainable lifestyles. Given the fact that so many environmental issues are “tragedies of the commons” (Hardin, 1968) in which one person must behave in a manner

they know will not alone have a significant impact, even as they are aware that many others are not contributing to the cause, it would seem that egoistic concerns cannot generally be relied on as a primary motivating factor. As Kollmuss and Agyeman (2002) observe in their review of models seeking to explain pro-environmental behavior, egoistic motivation (such as reduced energy costs) will only serve to motivate pro-environmental behavior when the behavior under consideration does not infringe on other egoistic concerns, such as convenience or desire to appear of higher social status. They explain, “A strong egoistic orientation is counterproductive when the desired behavior negates a person’s needs and desires” (p. 245). Thompson and Barton (1994) sum up the often inherent conflict between pro-environmental behaviors and an “anthropocentric” orientation:

Because the values underlying anthropocentric’s support of the environment are human-centered and basically utilitarian, they will be less likely to act to protect the environment if other human-centered values such as material quality of life or the accumulation of wealth interfere. Ecocentric individuals, however, will act to support the environment even if these actions involve discomfort, inconvenience, and expense that may reduce their material quality of life. (p. 150)

A study that attempted to manipulate subjects’ feeling of “connectedness to nature” sheds an interesting light on the issue of egoism and environmental concern. Frantz, Mayer, Norton and Rock (2005) conducted an experiment in which some participants were positioned in front of mirrors to increase “self-awareness.” They found that individuals who had reported lower levels of environmentalism in a previous questionnaire reported feeling less connected to nature when they were seated in the

mirror condition, whereas those with higher levels of pro-environmental attitudes reported similar feelings of connectivity to nature whether or not they were made more self-aware via mirror placement. The researchers also examined indications of narcissism, in particular “exploitativeness/entitlement”, and found that those high in this personality characteristic reported feeling less connected to nature in the “self-aware” condition, than those with lower scores on this element of narcissism. They observe that “the modern development of the individual as the basic unit of attention does pose a problem for the environment” (p. 433). However, they also note that under the low self-awareness condition, scores on exploitativeness/entitlement had no bearing on reported feeling of connection to nature, concluding that “making people less self-absorbed might promote their sense of feeling more connected to nature, even when they possess an anti-environmental characteristic” (p.434).

### **Appeals for Pro-Environmental Behavior**

In one of the earliest published studies addressing value orientations and pro-environmental behavior, Stern, Dietz and Kalof (1993) investigated how egoistic, social-altruistic, and biospheric values might influence the likelihood that an individual would be willing to take political action or pay additional taxes to support environmental protection. Their results for political action confirmed their initial expectation that beliefs regarding consequences for “valued objects” (self, others, the biosphere) were predictive of a person’s intent to act. However, they found that in terms of paying increased taxes, only those who were primarily motivated by egoistic concerns indicated that they were willing to pay more. The researchers resolved this unexpected finding with an explanation that holds special relevance for the current study. They speculated that the

different survey items may have focused participants' attention on different values, impacting their responses: "Questions about willingness to pay draw respondents' attention to the things on which they spend money, and these things are more likely to pertain to their well-being than to social-altruistic or biospheric values" (p. 336). This potential "focus effect" (p. 336, based on Cialdini, Reno & Kallgren, 1990), the result of framing an issue in the context of a certain value orientation, may thus make certain values more salient in a particular context. Given that a biospheric value orientation has been identified as the most effective in motivating pro-environmental behavior in numerous studies (as detailed in the previous section), and that egoistic values have been identified as potential barriers to pro-environmental behavior in many situations, this might suggest that appeals for environmental causes would best be framed to focus individuals on biospheric values, thus encouraging them to evaluate environmental issues from an ecocentric perspective.

Nonetheless, many researchers, including several of those who have linked ecocentrism to pro-environmental behavior, have suggested that appeals for the adoption of pro-environmental behavior should be based on self-interest, to be most likely to resonate with an individual's egoistic orientation (Schultz & Zelezny, 2003; Cantrill, 1993; Kaplan, 2000; Thompson & Barton, 1994). For example, Kaplan, who conflates ecocentric and altruistic values, argues for the "people-oriented approach" (p. 491), claiming that the focus on sacrifice in "altruistic" appeals for environmental causes is both doomed to failure and morally suspect, a type of self-effacement akin to Maoism. He offers instead a "Reasonable Person Model" (p. 492), recommending that environmental appeals be based on quality of life issues and other less tangible benefits

that may accrue from living sustainably, such as civic pride and other “evolutionary/cognitive” (p. 491) motivators. These types of concerns, distinct from any direct concern for the natural world and based on what might personally be gained from protection of nature, represent egoistic or utilitarian arguments for pro-environmental behaviors.

This strategy has been widely adopted by environmental groups, seemingly in an effort to promote environmental behaviors to a wide audience while not appearing to threaten the dominant social paradigm (Kilbourne, 1995). For example, Bolsen (2011) has reported on the frames used in the United States during the past decade in messages designed to promote energy conservation. In reviewing the press releases circulated by four major nonprofit groups, he found that a large majority emphasized the personal economic benefits of reducing energy usage (sometimes in combination with mention of environmental benefits), while government-sponsored PSAs aired between 2000 to 2007 overwhelmingly emphasized the societal (but never the purely environmental) benefits of conservation (i.e, maintaining the energy supply). These highly anthropocentric arguments for pro-environmental behavior appear to follow in the spirit of the recommendations of Kaplan (2000), Cantrill (1993), and others, who maintain that U.S. audiences in particular are likely best reached via appeals to egoistic or anthropocentric values.

However, Kaplan’s conception of altruism, in which one behaves in a manner believed to be “correct” but which is not personally rewarding, is clearly distinct from acting out of biospheric concern. Biospheric concern is by definition motivated by the “desire to gain rewards for all living things or to avoid harmful consequences for the

biosphere (Schultz, 2000, p. 394).” Indeed, ecocentrism, based in one’s feeling of connection to nature, or even reflecting the extension of one’s sense of self to the natural world, appears to be more similar to the class of altruism frequently described as “selfish” (Dawkins, 1976), in which an individual puts him- or herself at risk to protect a child or other kin. The studies summarized above strongly suggest that pro-environmental behavior is based not on self-sacrifice, but quite the opposite— in effect crossing the boundary into egoism (of a much deeper sort than is typically meant by this term)— as opposed to altruism. As DeYoung (2000) aptly observes (in a somewhat different context), “an ecocentric orientation is not only consistent with self-interest, it may be derived from it” (p. 520).

**Framing.** While the effectiveness of different types of frames in environmental appeals has infrequently been the subject of published studies, and utilitarian and existence value messages have seldom been examined, research from the communication, journalism, and political science fields concerning framing provides a helpful context for understanding the potential influence of these types of messages. Entman (1993), who considered the concept of framing to be a “fractured paradigm”, offered that “to frame is to *select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation* for the item described” (p. 52; italics in original). Scheufele (1999) offered a scheme for making sense of the disparate approaches to framing studies, dividing them by whether media frames or individual frames represent the dependent or independent variables. For the current study, we are concerned with media frames, in this instance those used for

appeals for pro-environmental behavior, as the independent variable, with the resulting individual/audience frames as the dependent variable. A multitude of studies, the most pertinent of which are summarized in detail below, have examined the effects of framing from this perspective, focusing on varied elements of messages as frames, and assessing the impacts of various frames (and combinations of frames) on audience perception of a given issue.

Nelson, Oxley and Clawson (1997) note that framing differs from other forms of persuasion not only in the sense that frames may not be consciously selected by those imparting them, but also in their impact on public opinion. They distinguish between “traditional” persuasion, in which the communicator strives to change an individual’s thoughts about an issue, and frames, which may change the importance the message recipient assigns to aspects of the issue. Further, they argue that, “unlike standard persuasion models, framing effects do not depend upon the recipient’s acceptance of the message’s assertions. For example, even if one disagrees completely with a frame’s assertion that welfare is unacceptable because the poor are lazy and irresponsible, the frame may still make salient one’s beliefs about the poor, positive or negative” (p. 228).

There continues to be debate in the framing literature regarding the mechanisms by which frames may operate on message recipients. Findings by Iyengar and Kinder (1987) have been frequently cited to argue that framing operates in a manner similar to priming, by making “certain issues or attributes more salient and likely to be accessed in forming opinions” (Weaver, 2007, p. 145). However, Nelson, Clawson and Oxley (1997) have empirically examined the influence of frames on the accessibility of frame attributes, using a computer-assisted response time task based on frame-associated words.

They found that while frames in their study *were* significantly correlated with individuals' opinions, they *were not* associated with response times, suggesting that accessibility was not mediating the effect of frames on opinions. Rather, they determined that the impact of frames on opinions was apparently mediated by “the frames’ influence on the perceived importance of specific *values* evoked by the issue” (pp. 574-5; emphasis added). Likewise, Lee, McLeod and Shah (2008) have considered how frames affect “the relative importance of relevant considerations” (p. 697) an individual depends upon to weigh options, and Chong and Druckman (2007) have asserted that “frames in communication exercise influence by emphasizing the primacy of certain considerations over others” (p. 107).

A study of the effects of frames in newspaper articles (Gross & D’Ambrosio, 2004) has suggested a possible route to framing effects via emotional response. Study participants were asked to read one of three stories about the Rodney King riots, one describing the events in a neutral, informational way, and the others with additional paragraphs emphasizing either the societal factors at play in causing the riots or the personal responsibility of those involved. While no significant effects were found on readers’ expressed intensity of emotional reaction, open-ended responses indicated that the ways in which participants described their reactions were influenced by frame. The authors conclude that, “we find patterns in individuals’ explanations for their emotions that vary in systematic and sensible ways by frame...we suspect that there may be indirect effects of frame on opinion through the influence of frames on emotional content” (p. 21).



Along this vein, in the current study it is expected that framing environmental appeals in a utilitarian manner may lead individuals to emphasize utilitarian/egoistic values, while messages appealing to the inherent value of nature may emotionally connect to message recipients, encouraging reliance on ecocentrism in considering environmentally responsible behavior choices. If this framing effect does occur, existence value messages would then likely be preferable, in light of the findings from environmental psychology that ecocentric motivation is the most reliable for promoting pro-environmental behavior. Note that this is a somewhat more nuanced approach than that frequently taken in studies of the effects of media frames; the study is focused not only on the overall *attitudes* expressed by participants regarding environmental issues, but also (and perhaps most importantly given the possibility of social desirability bias in such self-reports (Vining & Ebreo, 2002)), on the type of considerations (e.g., ecocentric or utilitarian) on which they rely to discuss their thoughts about environmental problems.

**Framing in environmental appeals.** The effectiveness of various frames in advocacy messages has been evaluated widely, particularly in health issue communication campaigns. While the influence of emotion on the persuasiveness of various frames has been the subject of many of these studies, they have generally addressed emotion in a heuristic sense, measuring the influence of moods (e.g., Nan, 2009; Yan, Dillard & F. Shen, 2010) and emotional responses such as fear, disgust, and anger (e.g., L. Shen, 2010; Meyerowitz & Chaiken, 1987), on intent to adopt the advocated health behavior. Most of this research has not however considered emotional *connection* as an element of frames, and is therefore not directly germane to the question of the relative effectiveness of utilitarian and ecocentric messages.

An extensive literature review in communication, public policy and environmental psychology journals uncovered very few studies that have specifically examined the effectiveness of various frames in appeals for pro-environmental behavior. By far the most relevant of these to the current study was conducted by Singhapakdi and LaTour (1991). They compared the effectiveness of two types of appeals for support of a beverage container deposit law. The “altruistic” appeal focused on the environmental benefits (less impact on natural systems) of passing the law, while the “utilitarian” appeal used a financial argument (reduction in beverage prices) in support of the law. They found that the altruistic appeal was significantly more effective than the utilitarian appeal in engendering reported intent to vote for the proposed law, and that the utilitarian appeal was not significantly more effective than a neutral appeal, which offered neither environmental nor financial arguments. While Singhapakdi and LaTour’s study actually preceded in time the entirety of the body of environmental psychology’s value orientations literature, their altruistic and utilitarian appeals closely match the concepts of the biocentric/ecocentric and egoistic/anthropocentric orientations.

In a more recent study, Werder and Schuch (2008) evaluated the effectiveness of several types of appeals for protection of gopher tortoise habitat. Their results indicated that certain message strategies affected “problem recognition” (based on Grunig & Hunt, 1984), or the extent to which individuals considered the destruction of gopher tortoise habitat to be an issue of concern. Of the seven different message frames (termed “activist message strategies” by Werder and Schuch) presented to participants in the study, the “persuasive” frame, which was defined as an appeal to “values or emotions”, was found to lead to the highest levels of problem recognition. However, while the study’s

definition of the “persuasive” message treatment appears to coincide with that of an ecocentric or existence value message, several of the other message types also included references to ecocentric values, making it difficult to draw a clear determination about the effectiveness of ecocentric appeals from the results.

Other research concerning the impacts of various frames on public opinion of environmental issues are more tangentially related to this study’s purpose. For example, Hart (2011) examined the relative efficacy of two frames encouraging concern about global warming. He found that those exposed to a “thematic” frame, in which “thousands” of polar bears were depicted as threatened with starvation, versus an “episodic” frame, which discussed the plight of a single polar bear, were more likely to support government action to reduce climate change. While Hart’s use of episodic versus thematic frames is not particularly useful as context for the current study, he also found a significant association between reported emotional response to the story read, regardless of frame, and statement of individual intent to change behavior. Since those who found the message more emotionally resonant were apparently more likely to accept personal responsibility for climate change, this may suggest that appeals emphasizing emotional connection may be more persuasive in generating a feeling of personal responsibility than those that rely on “reasoned” arguments for adopting pro-environmental behavior.

F. Shen (2004) also found that framing had an impact on both overall opinions and interpretation of an environmental issue. She presented study volunteers with two versions of an article concerning drilling in the Alaska National Wildlife Refuge (ANWR). One group read a pro-drilling, “economic benefits” position, while the other group was exposed to an anti-drilling, “environmental consequences” argument. After

reading the articles, participants were asked to list their thoughts about drilling at ANWR, as well as to indicate their level of support for drilling there. While those identified to be more concerned with environmental or economic issues prior to the experiment were more likely to retain these “schemata” in the ANWR issue, regardless of frame, participants were overall more likely to indicate support for drilling when exposed to the economic frame and opposition to drilling when exposed to the environmental consequences frame. They were also more likely to list thoughts related to the frames to which they were exposed. However, while the economic benefits and environmental consequences frames roughly parallel the current study’s conception of utilitarian and existence value messages, the use of these arguments to defend opposing positions, as well as the lack of a control group, makes it difficult to gauge the relative strengths of the types of arguments used in influencing opinions about environmental issues.

The efficacy of various types of frames for environmental messages was also considered by White, MacDonnel and Dahl (2011). They compared arguments emphasizing what would be lost if citizens did not recycle to those focusing on what would be gained if they did recycle, paired alternately with “concrete” how-to instructions or “abstract” references to why the behavior should be undertaken (e.g., saving air and water, contributing to the community). The results indicated that messages combining loss arguments with how-to information and gain arguments matched with abstract reasons were the most effective in encouraging householders’ recycling behavior. Although the study demonstrated that appeals based on ecocentric arguments can be effective in promoting recycling, all versions of the message used in the

experiment included utilitarian references along with mainly ecocentric arguments, making it difficult to draw clear implications for the current study.

**Frames and public opinion.** Although not directly related to environmental issues, many studies investigating the effect of news and politics frames are of relevance to the current study because of what they reveal about the impacts of frames, particularly value frames, on thoughts and opinions. In their seminal work on the impact of framing on political opinions, Nelson, Oxley, and Clawson (1997) provided college students with one of two anti-welfare messages. One article focused on “undeserving” welfare recipients and the other emphasized the negative effects of welfare payments on the economy. As the researchers had expected, support for welfare policy did not vary between the two treatments. However, they found that the “undeserving recipients” frame led subjects to more heavily weight their beliefs about the causes of poverty as they considered the welfare issue. In a similar study, the same researchers (Nelson, Clawson & Oxley, 1997) investigated the impact of framing on students’ tolerance for granting permission for the Ku Klux Klan to hold a public rally. News stories were framed from either a freedom of speech or public safety perspective. Results showed that frames were influential in determining both support for a Klan rally, as well as which aspects of the issue (free speech or public order) were considered most important by the study participants in forming their opinions.

Brewer and Gross (2005) had similar results, finding that frames were predictive of the considerations people made when discussing the issue of school vouchers. Those exposed to either pro- or anti-school- voucher messages emphasizing the importance of equality were more likely to use equality language when describing their thoughts on the

issue. In addition, those exposed to both the pro- and anti-voucher messages were by far the most likely to reference equality when listing their thoughts, suggesting that message frames may have an additive effect. Also of note is that those exposed to either frame expressed fewer thoughts overall about the voucher issue than those in the control group, while those exposed to both messages expressed the lowest number of thoughts on average. The study authors conclude that, “exposure seemed to simultaneously focus and narrow citizens’ thoughts about a specific policy issue” (p. 943). This observation echoes that made by Price, Tewksbury and Powers (1997) regarding the way news frames can influence the types of thoughts reported by readers. They note that thoughts recorded following exposure to varied news frames “illustrate a kind of hydraulic pattern, with thoughts of one kind, stimulated by the frame, driving out other possible responses” (p. 501).

Valkenburg, Semetko, and De Vreese (1999) had similar findings in another thought-listing experiment. They used different news frames for articles concerning either crime rates or the introduction of the euro. As hypothesized, when participants expressed their opinions on these issues in their own words, their responses were strongly influenced by the frame used in the article they had just read. Those in the “human interest” condition emphasized emotional elements and those in the economic condition stressed costs and other financial considerations significantly more often than other groups. The researchers conclude that “news frames give the audience direction on how to conceive of a specific issue or event” (p. 567).

A few studies of frames in news and politics have specifically examined the impact of “value frames” on the thoughts expressed by study participants. For example,

F. Shen (2004) found that the use of two distinct value frames was predictive of study volunteers' listed thoughts and expressed opinions regarding stem cell research. She reported that those exposed to the anti-stem cell research, "ethical" frame were more likely to object to such research and those exposed to the pro-stem cell research, "medical benefit" frame more likely to support it. A related study (F. Shen and Edwards, 2005) yielded similar results, finding that participants provided with a pro-welfare, "humanitarian" frame were more supportive of the welfare system than those reading an article employing a work requirement, "economic individualism" frame. The researchers speculated that "activation of values may in turn result in a change of attitudes" (p. 799). This observation lends support to the primary hypotheses of the current study, that framing environmental issues in ecocentric terms may lead people to rely on ecocentric values as they make decisions regarding pro-environmental behavior. However, while the ethical/benefits and humanitarian/individualism frames do roughly correspond to the current study's focus on existence value versus utilitarian frames, these studies both used varying frames for opposing arguments, making it challenging to extrapolate direct implications for the current study.

Shah, Domke and Wackman (1996) also examined the influence of frames on values, in this case those used by both U.S. undergraduates and Evangelical Christians to make voting decisions. Study participants read newspaper articles about fictional candidates' positions on health care, describing either an ethical ("right or wrong") or material/economic benefits rationale underlying each position. They were then asked to select the candidate they preferred, as well as to respond to an open-ended question indicating which issues they had considered the most important in making their decisions.

The study found that in both populations studied (but to a greater extent in the Evangelical group), those provided with the ethical frame were significantly more likely to interpret health care and other issues as matters of ethics, suggesting that ethical framing may lead to reliance on ethical values as a “primary method of judgment and decision-making” (p. 517). The researchers assert that ethics and morals are likely closely tied to an individual’s self-concept, making frames that invoke them potentially strongly persuasive with many (though not the majority of) message recipients.

In another study investigating how framing might influence reliance on certain values, Brewer (2002) asked undergraduates to read articles discussing the issue of gay rights in either a pro-“equal rights” frame, or in an anti-gay-rights, “moral values” frame. The students then recorded their opinions about the issue, as well as the thoughts that they had experienced while considering their positions. He found that those who had read the article framed from an equality perspective were significantly more likely to invoke the value of equality in their responses, while those who read the article framed in a morality stance were significantly more likely to adopt morality language in their responses. However, Brewer notes that although frames were clearly exerting an influence on the way students expressed their thoughts about the issues, the participants sometimes used these imparted “value words” to argue against the article’s position, for example citing moral concerns to justify the protection of gay rights, rather than to argue for discrimination against gays. Overall though, his study demonstrated that framing can have a powerful effect on the values people use to evaluate certain issues.



## **Literature Summary**

The preceding discussion was intended to establish two main points of significance for the current study. First, numerous studies have demonstrated the strong correlation between pro-environmental behavior and ecocentrism, emotional connection, self-identity with nature and similar expressions of non-utilitarian values for the natural world, as well as a negative correlation between pro-environmental behavior and egoistic values in many instances. Second, while the framing researchers nearly universally point out that frames are not generally powerful enough to influence opinions all the time, this research does suggest that media frames can have an important impact on public opinion, especially by providing the framework of values used to evaluate a given issue.

## **Hypotheses and Research Question**

The central premise of this study is that appeals based on the inherent, “existence” value of nature will be more likely than utilitarian appeals to resonate with ecocentric values, and may thus lead to a stronger personal connection to environmental issues in general, creating positive “spillover” to other environmental issues. The goal of this study is to gauge the possible impact that environmental PSAs can have on a recipient’s level of ecocentric concern, thus potentially impacting the likelihood that individual will intend to engage in a range of pro-environmental behaviors. A secondary goal of the study is to determine the effect of these PSAs on behavioral intention with regard to a range of pro-environmental behaviors. Specifically, the study was designed to test the following hypotheses:

*H1a: Existence value frames will be more likely than utilitarian frames to elicit ecocentric-oriented thoughts regarding environmental issues.*

*H1b: Those exposed to existence value frames will be more likely to express ecocentric-oriented thoughts than those not exposed to an environmental PSA (of either frame).*

*H2a: Those viewing existence-value framed PSAs will be more likely to express intent to engage in various pro-environmental actions, than those viewing utilitarian framed PSAs.*

*H2b: Those exposed to existence value frames will express higher levels of pro-environmental behavioral intention than those not exposed to an environmental PSA (of either frame).*

Despite the empirically established link between ecocentrism and commitment to pro-environmental behavior, there has been considerable speculation in the environmental psychology literature suggesting that utilitarian appeals may be more strategic than existence value appeals if the goal is to engage a meaningful portion of the U.S. public. Therefore, the following alternative hypothesis was offered:

*(Alternative) H2c: Utilitarian value frames will be more likely than existence value frames to encourage intent to undertake various pro-environmental actions for those who are highly motivated by egoistic concerns.*

Additionally, based on Study 1 results, a research question was added:

*RQ: To what extent might there be differences in expressed levels of ecocentric thought, pro-environmental behavioral intention, and orientation toward ecocentrism between those viewing print PSAs that contain identical images suggesting impacts to nature, but accompanied by text relaying either a utilitarian or existence value argument?*

## Chapter 3: Method

The current study was administered online, with participants viewing environmental PSAs employing either an existence value or utilitarian frame. In an exploratory first study, participants were assigned randomly to one of six treatment groups with each group viewing a different video PSA. For the main study, two pairs of print PSAs were developed based on the most effective video PSAs from the first study. Participants in both studies completed post-viewing questionnaires designed to assess ecocentric thoughts regarding environmental issues, as well as intention to engage in various pro-environmental behaviors. To test the alternative hypothesis, that individuals who are highly egoistic will be more receptive to utilitarian appeals, participants also completed a post-test designed to indicate their orientation toward egoism; the post-test also measured ecocentrism.

### **Study 1**

Study 1 was designed as an exploratory experiment, using existing video PSAs to represent three examples of utilitarian frames and three examples of existence value frames.

While designing PSAs to be as similar as possible except for frame would have minimized the possibility of measuring something other than the effect of the intended independent variable (although not eliminate it; see O’Keefe, 2002, Chapter 7), the decision was made to use these professionally produced PSAs to yield the best opportunity for observing effects on ecocentric thoughts and behavioral intention, as well as to provide insights for use in designing print PSAs in the main study. (See Table 1 for summary descriptions of the PSAs.) Although the use of existing PSAs in experiments is

uncommon, this approach has been taken in evaluating both anti-smoking (Strasser, Cappella, Jepson, Fishbein, Tang, Han & Lerman, 2009) and anti-drug (Fishbien, Hall-Jamieson, Zimmer, Haeflten & Nabi, 2002) PSAs. In both of these studies, the researchers used existing PSA campaigns thought to be representative of specific approaches (e.g., “themes,” “message sensation value,” “negative outcome”), and presented study participants with several examples (ranging from four to six, depending on the study) of each type of PSA. PSAs in these studies were classified into groups based either on the judgment of the researchers themselves (Fishbein et al.) or that of raters who were not participants in the actual experiment (Strasser et al.). For the current study, frame categorization was confirmed via a group of external judges.

***Participants.*** The initial experiment was administered to 193 undergraduate students via the University of Maryland’s SONA system. Students were awarded extra course credit for completing the study. Participants ranged in age from 17 to 28 years, with a mean age of 19.87; almost 90% were between 18 and 21 years old. Sixty-eight percent of the participants were female and 32% male. The group skewed liberal politically, with 43.5% identifying themselves as liberal or very liberal and 23.3% self-identifying as conservative or very conservative; 33.2% described themselves as neither conservative nor liberal.

Participants were required to review and electronically sign a consent form before beginning the experiment, in compliance with Institutional Review Board requirements (see Appendix A). All personally identifiable information was deleted from the data. An email link was provided from both SONA and the experiment Web site, to allow

participants to request more information about the experiment or technical guidance on completing the questionnaire.

Table 1. Summary of characteristics of environmental PSAs by frame and issue.

Issue		Utilitarian Frame	Existence Value Frame
<b>Energy conservation (personal use)</b>	<i>Name</i>	Cliff	Five Simple Things
	<i>Tagline</i>	“Saving energy saves you money”	“It isn’t hard to start changing the world”
	<i>Tone</i>	modern/quirky	modern/sincere
	<i>Year</i>	2011	2011
	<i>Look</i>	color/crisp	black & white/crisp
<i>From</i>	Ad Council	WildAid	
<i>Time</i>	30 seconds	30 seconds	
<b>Clean energy (energy policy)</b>	<i>Name</i>	Pickens Plan	The Heat is On
	<i>Tagline</i>	“We’ve had our wake-up call; it’s time to act”	“The heat is on – get involved”
	<i>Tone</i>	urgent/sincere	urgent/sincere
	<i>Year</i>	2010	2007
	<i>Look</i>	color/fair quality	color/fair quality
<i>From</i>	T. Boone Pickens	NRDC	
<i>Time</i>	30 seconds	34 seconds	
<b>Lawn chemicals</b>	<i>Name</i>	Save the Crabs, Then Eat ‘em	Fertilizing Water
	<i>Tagline</i>	“Ridding the planet of delicious blackfin is just plain wrong”	“You’re not just fertilizing the lawn”
	<i>Tone</i>	humorous/irreverent	humorous/silly
	<i>Year</i>	2005	1995
	<i>Look</i>	color/good quality	color/fair quality
<i>From</i>	Chesapeake Club	Puget Sound Action Team	
<i>Time</i>	30 seconds	30 seconds	

**Independent variables.**

**Frame.** PSA frame was the primary independent variable, with each treatment group viewing an environmental PSA employing either an existence value or utilitarian frame. The PSAs selected to represent the existence value frame in this study did not overtly describe any specific consumption value for the viewer --- i.e., they referred only to the fact that the natural world is impacted in some way by the given activity, without

discussion of what that might entail in terms of repercussions for the individual, and without making primarily anthropocentric arguments. In contrast, the PSAs chosen to represent a utilitarian value frame relied explicitly on an argument predicting a positive and tangible effect for the individual if the recommended behavior were adopted, by linking the behavior change with the reward of a material or otherwise anthropocentrically oriented reward.

**Value orientation.** Orientation toward egoism and ecocentrism was evaluated via a truncated version of Schwartz's (1992, 1994) Social Values Inventory. The original inventory included 56 items designed to classify four value clusters. It was first adapted for understanding motivation for environmentally responsible behavior by Stern et al. (1993), with two of Schwartz's four "value clusters", "Self-Transcendence" and "Self-Enhancement" representing, respectively, social altruism/biocentrism and egoism. Since then, it has been used in varying forms and lengths by many researchers investigating the relationship between value orientations and pro-environmental behavior (e.g., Stern & Dietz, 1994; Stern et al. 1995, 1998, 1999; Karp, 1996; Schultz & Zelezny, 1998; Nordlund & Garvill, 2002; Thøgersen & Ölander, 2003; de Groot & Steg, 2007, 2008, 2010). This study used the shorter version first developed by Stern et al. (1998, 1999) to measure ecocentric orientation, and the modification by de Groot and Steg (2007, 2008, 2010) to measure egoism.

The version of the values inventory used for this study included five items (social power, wealth, authority, influential, ambitious) to indicate egoism, and three items (protecting the environment, unity with nature, respecting the earth) to indicate ecocentrism (originally labeled biospheric orientation). Following De Groot and Steg and

Stern et al. (1998, 1999) (and based on Schwartz's original values inventory), respondents were asked to indicate to what degree each statement "represents a guiding principle" in their lives on a 9-point scale, with -1 indicating that the item is "opposed to" their values, 0 that it is "not important," and 7 that it is "extremely important." Also following the approach of these studies, participants were asked to consider the listed values in relationship to each other, so that no more than a few values were rated as extremely important.

*Reliability.* Consistent with previous studies, the egoism scale showed good reliability, with a Cronbach's alpha of .715 [comparable to the alpha of .74 to .75 found in earlier studies (De Groot and Steg 2007, 2008, 2010)]. Item-to-total correlations ranged from .512 (ambition) to .796 (authority). Also consistent with previous studies, the ecocentrism scale had very good reliability, with a Cronbach's alpha of .866 [compared to .84 from two previous studies (Stern et al., 1995)]. Item-to-total correlations were high for all three items, ranging from .888 for unity with nature to .915 for respecting the Earth.

*Construct validity.* Although the values inventory used in the current study has previously been validated by several researchers, an unexpected significant and moderately strong correlation was found between the egoism and ecocentrism scales scale items ( $r = .327, p = .000$ ). Ecocentrism was found to be significantly correlated with all but one of the egoism scale items (ambition), with the highest correlation occurring with social influence ( $r = .347, p = .000$ ). This might suggest that for this group of students, the results were not reflective of the same construct measured by previous value orientation studies.

**Dependent variables.** The study evaluated the effect of frame on two distinct dependent variables: (1) ecocentric thoughts, as evidenced by responses to one open-ended question; and (2) behavioral intent for a set of “environmental citizenship” behaviors (voting for pro-environmental candidates, indicating support for environmental protection on a survey, supporting environmental protection policies, donating money to support environmental causes).

***Ecocentric thoughts.*** In order to evaluate the degree to which frame influenced participants’ ecocentric thoughts, the first question included on the post-viewing questionnaire was open-ended, following the format frequently used (e.g., Brewer, 2002; Brewer & Gross, 2005; Shah et al., 1996; F. Shen, 2004; F. Shen & Edwards, 2005; Valkenberg et al., 1999) to detect the impact of frames on considerations used in describing issues and opinions. Open-ended questions have also been used in studies that examine ecocentrism as a dependent variable (Schultz, 2000; Sevillano et al., 2007; Bergenguer, 2010). As noted by Holstein (2003), “the nuances and complexity of individual cognition do not follow the clear cut viewpoints that the structure of multiple choice questions demands” (p. 18). Thus, open-ended questions, when carefully worded to avoid referring to either “thoughts” or “feelings” (Hinds & Sparks, 2008) or to particular values (Stern et al., 1993), can provide the opportunity for expression of a more genuine and complete representation of an individual’s opinion. With this in mind, participants were asked to respond to the following question, which used the term “views” rather than “reasons” or “reactions”, to minimize the potential for biasing responses toward logical or emotional arguments, respectively:

*Is protection of the natural environment important? Please share your views in the box below.*



Responses were coded blindly without knowledge of treatment group. Responses that appealed to the inherent value of nature, for example including mention of the importance of protecting wildlife or natural beauty, were coded as “2”; those responses lacking any reference to nature’s inherent value (versus, for example, resource value for humans) were coded as “1”.

*Construct validity.* Previous studies have generally found a more liberal political bias to be correlated with both ecocentrism and pro-environmental intention. Therefore, to assess construct validity of the ecocentric thoughts measure, Pearson product-moment correlation coefficients were calculated between ecocentric thoughts scores and political orientation. As expected, a weak but significant correlation was found between a more liberal political orientation and increased ecocentric thoughts ( $r = .170$ ,  $p = .018$ ), and ecocentric thoughts was weakly but significantly correlated with both post-test ecocentrism ( $r = .193$ ,  $p = .007$ ) and behavioral intent ( $r = .198$ ,  $p = .006$ ).

*Behavioral intent.* The inclusion of measures of behavioral intent in this study was based on the widely tested theory of reasoned action developed by Fishbein and Ajzen (1975), which explains how people tend to behave in a manner that is consistent with their intent to perform that behavior. Because other factors, such as external constraints, may interfere with the actual execution of a behavioral intention, the measure cannot be considered a direct prediction of behavior, and can be expected to over-estimate actual behavior. However, a meta-analysis of 87 studies conducted by Sheppard, Hartwick & Warshaw (1988) found a strong correlation between stated intention and behavior, suggesting that behavioral intention is a meaningful predictor of actual behavior. It thus serves as a suitable indicator in the current non-longitudinal study for

comparing the effects of different message frames on commitment to engage in pro-environmental behavior.

The pro-environmental behaviors measured in the current study are related to environmental citizenship, operationalized as support for unspecified political candidates, policies, and organizations supporting environmental protection. A conscious choice was made to avoid asking specifically about consumer behaviors, since the latter can be so strongly influenced by external constraints. Also, while debate often exists regarding which consumer behaviors are truly the most “environmentally conscious” choice (e.g., paper or plastic?), such generic measures of environmental citizenship, while correlated with pro-environmental consumer behaviors (Karp, 1996; Stern et al., 1999), are not prone to such matters of interpretation, nor typically constrained by infrastructural or socioeconomic factors. In this way, they can provide a more direct indication of what some have argued to be the most important change that can take place for environmental causes: acceptance, support, and demand for systemic change in government policies promoting environmental protection (World Wildlife Fund, 2009).

*Reliability.* The four items designed to measure general behavioral intent (INTENT) were evaluated to assure that they represented a single dimension (or aspect) of environmental citizenship. The index had good reliability, with a Cronbach’s alpha of .738. Item-to-total correlations were good for all items, ranging from .692 (intent to indicate support for pro-environmental policies on a survey) to .802 (intent to donate to environmental organizations). However, because there were considerable differences among the treatment groups in terms of which elements of INTENT were affected by the PSAs, the four sub-components were also analyzed individually.

*Construct validity.* To assess construct validity of the behavioral intention measure, Pearson product-moment correlation coefficients were calculated between INTENT scores and political orientation. As expected, a weak but significant correlation was found between a more liberal political orientation and INTENT ( $r = .190, p = .008$ ). In addition, ecocentrism and INTENT were strongly correlated ( $r = .521, p = .000$ ).

## **Procedures**

Participants were assigned at random to one of six treatment groups. Three of the treatment groups viewed environmental PSAs employing a utilitarian frame, and the other three treatment groups viewed environmental PSAs using an existence value frame. The environmental PSAs concerned energy conservation, energy policy, and lawn care. All treatment groups also viewed two PSAs addressing non-environmental subjects (stroke awareness and child Internet safety) prior to viewing the randomly assigned environmental PSA. Each PSA ranged from 30 to 60 seconds long (with roughly equivalent lengths for each issue by frame). Participants were asked to provide their reactions to the PSAs immediately following viewing of each, responding to a short series of questions regarding likability, tone, humor, memorability, and promotion of self-efficacy (see Appendix B). These questions served to disguise the primary purpose of the study, appearing to be a test of the perceived characteristics of PSAs, rather than as a test of the possible effects of the environmental PSA on attitudes of participants. Information from these questions also helped to elucidate significant differences among the PSAs (other than frame) that may have affected persuasiveness, and were considered in the analysis of results.

Following viewing of the PSAs and responding to the evaluation questions about each PSA, all groups completed a post-viewing questionnaire (see Appendix C). The questionnaire was explained as a way for the researchers to understand the participants' opinions regarding several issues, which may have impacted their evaluations of the PSAs. It included items related to attitudes and behavioral intent regarding environmental as well as health and child safety issues, in order to minimize any possible influence on responses if study participants are made aware of the actual focus of the study.

Additionally, participants were asked to respond to a short post-test to gauge egoism and ecocentrism orientation (see Appendix D). These items were included to allow for evaluation of the alternative hypothesis, that those who are more egoistically oriented may be more receptive to utilitarian frames than existence value frames. Although using a post-test raised the possibility that responses on the value orientation test would be biased in some way by the experimental treatments, this approach was chosen in lieu of a pre-test, to avoid revealing the purpose of the study and with less risk of potentially biasing participants at the start, thereby altering results related to the principal hypotheses. (The information collected on ecocentrism was intended to be used as part of the assessment of construct validity of the ecocentric thoughts and behavioral intention measures, as discussed below.)

Finally, participants were asked to respond to three demographic questions, indicating age, sex, and political orientation. Past studies have found that these factors, particularly political orientation, have sometimes been correlated with levels of ecocentrism and tendency to engage in pro-environmental behaviors.

**Overview of Study 1 results.** (See Appendix E, including Tables 2 through 6, for detailed Study 1 results.) ANOVA results indicated that frame had an independent effect (apart from topic) on both intention to indicate support for pro-environmental policies on a survey (partially supporting H2a) and, at a level approaching statistical significance, on ecocentric thoughts (weakly supporting H1a). In addition, the alternative hypothesis (H2c), that a utilitarian frame would be more effective for high-egoism participants, was rejected. Instead, exposure to utilitarian frames led more egoistic participants to report significantly lower levels of intent to express support for pro-environmental policies on a survey than if they had viewed an existence value frame PSA.

However, although a manipulation check confirmed the assignment of frame categories, the use of existing video PSAs introduced countless confounds into the analysis, which make interpretation of these results murky at best. Of most concern in this regard, the groups viewing the two energy conservation PSAs, Five Simple Things (existence value) and Cliff (utilitarian), had the highest scores for behavioral intent, ecocentric thoughts, and (unexpectedly) post-test ecocentrism; these were also the two best-liked PSAs, further muddling the results. Similarly, the group viewing Pickens, the utilitarian energy policy PSA, had the lowest scores on behavioral intent and ecocentric thoughts; this was also the least liked PSA.

Due especially to the large disparities in the degree to which individual PSAs were preferred by participants, the reasons underlying the unexpected results related to two of the utilitarian PSAs (Cliff and Pickens) can only be conjectured. For example, the Cliff PSA imparted an overtly entirely utilitarian message, arguing that throwing away energy is the same as throwing away “all the things you could have bought.” However,

some of the items that the young couple pictured in the PSA are throwing off of a cliff may be construed as symbolic of childhood (small bicycle, dollhouse), and may therefore have evoked thoughts of concerns for the future. In addition, the fact that the items were smashed against a background of apparently untouched nature may have compounded this effect, leading some participants to adopt a more ecocentric stance. (Note that the Cliff PSA was unanimously considered to be *not* promoting an “impacts to nature” message by the manipulation check group, suggesting that any subtextual suggestion of concern for the natural world was unlikely to have been consciously perceived.) Alternatively, perhaps the mere fact that participants liked the Cliff PSA led them to develop (at least temporarily) a more favorable attitude toward environmental issues, including a more ecocentric outlook. Likewise, it is not possible to determine whether the lack of either textual or subtextual references to the natural world in the Pickens PSA transmitted this lack of concern to participants, or if it was their disliking of the PSA that led them (at least temporarily) to have a more negative attitude toward environmental issues, including lower levels of ecocentrism.

Another important limitation of the Study 1 design was its lack of a control group. Without a control group to provide baseline data, it is impossible to determine whether those PSAs which appeared to favorably or unfavorably influence the dependent variables in relation to other PSAs were actually influential, or if the other PSAs were impacting participants’ scores on these factors in the opposite direction. It also makes interpretation of the egoism scores, for evaluation of the alternative hypothesis, problematic.

Overall, despite the first experiment's inability to isolate the factors that were influential in impacting the dependent variables, the results did suggest that ecocentric thoughts, intent, and even ecocentrism may be impacted by a single viewing of an environmental PSA, at least immediately following that viewing. Insights from Study 1 results were incorporated into the design of the main study, with the primary intention of better controlling for PSA qualities other than frame.

### **Main Study**

For the main study, the methods were adjusted somewhat. The most significant difference was that print PSAs were used, and were developed specifically to minimize possible confounding factors. One pair of these PSAs was also designed to help answer the Research Question added for the main study, concerning the impact of images conveying ecocentric ideas, regardless of textual frame. In addition, the factor evaluating ecocentric thoughts, an open-ended question in Study 1, was replaced with a close-ended series of forced ranking questions in the main study, in order to eliminate any subjective bias in evaluating responses. Also, one item was added to the post-test questionnaire, addressing the specific behavior addressed in the PSAs (energy conservation). Finally, a control group was included, so that baseline levels of ecocentric thoughts, intent, and value orientation could be compared to treatment group results.

One of the most challenging aspects of interpreting the Study 1 data was the fact that the two most effective PSAs concerned the same topic (energy conservation), together with the finding that these PSAs were also considerably better liked than the others. Therefore, still shots were extracted from these two PSAs for the main study to

provide the basis for developing pairs of utilitarian and existence-value messages, with each pair based on one of these two PSAs.

### **Participants**

The experiment was administered to 230 undergraduate students via the University of Maryland's SONA system. Students were awarded extra course credit for completing the study. Participants ranged in age from 18 to 33 years, with a mean age of 20; over 98% were between 18 and 23 years old. Seventy-three percent of the sample was female. The group skewed politically liberal, with 44.4% of the students self-identified as liberal (38.7%) or very liberal (5.7%), and 21.3% as conservative (20.4%) or very conservative (.9%); 34.3% described themselves as neither conservative nor liberal.

Participants were required to review and electronically sign a consent form before beginning the experiment, in compliance with Institutional Review Board requirements (see Appendix A). All personally identifiable information was deleted from the dataset. An email link was provided from both SONA and the experiment Web site, to allow participants to request more information about the experiment or technical guidance on completing the questionnaire.

### **Independent variables.**

*Frame.* The principal independent variable of the main study was frame, as described for Study 1. Two pairs of PSAs were developed, with each pair expressing an explicitly utilitarian or existence value frame. (See Appendix F for descriptions of the print PSAs.) The pair based on the Five Simple Things video PSA was intended as a clearly dichotomous example of utilitarian versus existence value frame, while the utilitarian version based on the Cliff video PSA was anticipated to convey a somewhat



ambiguous subtext, based on Study 1 results. (The latter pair was considered in a Research Question added for the main study, concerning the potential for images to impart a frame distinct from that explicitly transmitted by the text.)

***Value orientation.*** The post-test used to assess value orientation (egoism and ecocentrism) was identical to that used in the first study (see Appendix D). Based on Study 1 results, however, ecocentrism and egoism were also considered as possible dependent variables.

***Reliability.*** Unlike in Study 1, the egoism scale showed only fair reliability, with a Cronbach's alpha of .584. Item-to-total correlations ranged from .554 for social influence to .716 for authority over others. Dropping items from the index did not improve its reliability. The ecocentrism scale was found to be highly reliable, with a Cronbach's alpha of .831 (.866 in the Study 1). Item-to-total correlations were high for all three items, ranging from .840 for protecting nature to .877 for respecting the Earth.

***Construct validity.*** There was no significant correlation found between egoism and ecocentrism, neither positive (as in Study 1) nor negative (as might have been expected based on previous value orientation studies).

### **Dependent variables.**

***Ecocentric thoughts.*** The first study used an open-ended question to evaluate ecocentric thoughts. This approach required coding by the researcher that, while validated via positive correlations with both behavioral intent and post-test ecocentrism, did introduce the potential for subjective bias in the data analysis. Therefore, the main study substituted a series of forced-ranking items concerning the participants' views

about what is most important about protecting nature. The ecocentric thoughts ranking was the first question on the post-viewing questionnaire. Participants were first asked,

*Do you believe it is important to protect nature/the environment?*

All but seven of the participants (97%) indicated assent to this question, and were then automatically routed to this question:

*People have varying opinions about why protection of the natural world is important. Please indicate which three of the following are most important to you, in order of their importance.*

Participants were then required to rate their top three choices, with 1 labeled as “most important,” from among the following, presented in random order:

1. *For its own sake (intrinsic value)*
2. *For the sake of preserving the beauty of nature*
3. *For the benefit of wildlife*
4. *As a source of natural resources for human society (now and in the future)*
5. *For the protection of human health*
6. *To protect recreational opportunities for people*

The response choices were based on results from the open-ended question in the Study 1.

Although that format had provided a way to gauge spontaneous thoughts about environmental issues, the ranking format in the main study was intended to be a more objective way to elicit participants’ priorities with regard to environmental issues, and granted them a range of choices that they may have considered in an open-ended format, but that may not have been volunteered without specific prompting (either because these things are taken for granted as important/are considered to “go without saying,” or because some participants may not have considered them to be “important” to others).

The ranking items were coded in the following manner: ecocentric items (1 through 3 in the list above, but note that these items were presented in random order to participants) ranked in all top 3 positions was scored 4, ecocentric items in the first and

second positions only was scored 3, an ecocentric item in the first position only was ranked 2, an ecocentric item in the second position only was ranked 1, and all others were ranked 0. (Note that in the Study 1, responses including any ecocentric thoughts were coded 2, while those lacking such references were coded 1.)

*Construct validity.* Unlike in Study 1, the ecocentric thoughts measure used in the main study was not validated by correlations with either ecocentrism or INTENT, although it was negatively (though weakly) correlated with egoism ( $r = -.209$ ,  $p = .001$ ).

*Behavioral intent.* The behavioral intent index used in the main study duplicated that of the first study. In addition, one item was added, apart from the general INTENT index, regarding energy conservation (the specific behavior addressed in the environmental PSAs), following the questions regarding general behavioral intent. This item asked participants to indicate, on a five-point scale, the likelihood that they would "be mindful of energy use (e.g., turning off lights, turning down the heat)" in the coming year. (Two items were also added to address the topics of the filler PSAs.)

*Reliability.* As in Study 1, the behavioral intent index had good reliability, with a Cronbach's alpha of .748 (compared to .738 in Study 1). Item-to-total correlations were good for all items, ranging from .720 for intent to email elected representatives regarding environmental issues, to .786 for intent to donate to environmental organizations. As in the first experiment, however, there were considerable differences among treatment groups in terms of impacts on the index components. Therefore, the index components were also considered separately in the analysis of results.

*Construct validity.* As expected based on previous studies and Study 1 results, a moderate and significant correlation was found between political orientation and general

behavioral intent (INTENT;  $r = .338$ ,  $p = .006$ ). Political orientation was also weakly correlated with intent to conserve energy (ENERGY;  $r = .187$ ,  $p = .005$ ), a measure that was not included in the first study. Also, as in Study 1, a very strong correlation was found between ecocentrism and behavioral intent (INTENT;  $r = .573$ ,  $p = .000$ ). There was also a moderate correlation between ecocentrism and the specific intent to conserve energy ( $r = .308$ ;  $p = .000$ ).

**Value orientation.** As noted above, based on the results from Study 1, ecocentrism and egoism as measured on the values inventory (Appendix D) were considered as possible dependent variables in the main study. (Reliability of these indices is discussed in the Independent Variables section above.) Although ecocentrism and egoism have commonly been considered as independent variables in studies concerning the relationship between value orientation and pro-environmental behavior, those studies that have considered ecocentrism as a dependent variable (Schultz, 2000; Sevillano, Aragonés & Schultz, 2007; Berenguer, 2007, 2010) have found it be malleable in response to prompts toward empathizing with wildlife. The results from Study 1 suggest that ecocentrism may also vary in response to viewing environmental PSAs, so the main study will attempt to determine whether frame may be influential in that regard.

**Procedures.** As in Study 1, treatment groups viewed PSAs employing either an existence value or utilitarian frame. The study evaluated the effect of frame on: (1) ecocentric thoughts, as evidenced by responses to a series of close-ended ranking questions; (2) behavioral intent for the same set of four “environmental citizenship” environmental behaviors used in Study 1; and (3) behavioral intent for energy conservation, the specific topic addressed by the PSAs. (See Appendix G for the post-

viewing questionnaire; Appendix G also lists the questions related to the filler PSAs concerning adult health and disaster preparedness, which were included to help to mask the true purpose of the study.) Except for the ecocentric thoughts ranking question, all items were based on a five-point Likert-style rating scale, ranging from “strongly disagree” to “strongly agree”, with “neutral” in the middle position, as in Study 1.

Participants were assigned at random to one of four treatment groups or to a control group. Two treatment groups viewed utilitarian frame PSAs, and two viewed existence value PSAs. All treatment groups also first viewed the same two PSAs addressing non-environmental subjects (adult health and disaster preparedness). The control group viewed the same two non-environmental PSAs as did the treatment groups, and responded to all of the same questions as the treatment groups (except of course for the evaluation questions for the environmental PSA).

The PSAs varied between pairs only in terms of the text used; all major images were identical between pairs (in the case of the Five Simple Things adaptation, there was one difference in images across the pair: the green earth logo was included in the existence value PSA, but omitted from the utilitarian version). See Appendix F for descriptions of the print PSAs.

Because assignment to treatment groups was conducted randomly by the survey Web site, the treatment group sizes varied a small amount, with the smallest number assigned to the utilitarian version of the Cliff PSA (Cliff Money;  $n = 43$ ) and the largest number assigned to the existence value version of Cliff (Cliff More:  $n = 48$ ) and the control group; forty-five students were assigned to the existence value version of Five Simple Things (Five World), and 46 were assigned to its utilitarian counterpart (Five

Money). Frame groups were also slightly disproportionate, with more assigned to the existence value frame PSAs (n = 93) than to the utilitarian frame PSAs (n = 89).

As in the first study, participants were asked to provide their reactions to the PSAs immediately following viewing of each, responding to a short series of questions regarding likability, tone, humor, memorability, and self-efficacy, and then to respond to a post-viewing questionnaire. The questionnaire included a group of forced ranking items to assess ecocentric thought, as well as forced ranking questions for the two filler issues. All other items on the questionnaire were identical to those used in Study 1, with the exception of filler questions (the child safety items in Study 1 were replaced with those related to disaster preparedness), and the addition of three items related to the specific behaviors addressed in the environmental and filler PSAs (see Appendix G).

In addition, participants were asked to respond to the same post-test values inventory that was used in Study 1 to gauge egoistic and ecocentric orientation (Appendix D). While these items were included in Study 1 to allow for evaluation of the alternative hypothesis, it was anticipated, based on Study 1 results, that egoism and ecocentrism may themselves be impacted by the PSAs viewed. Therefore, both factors were considered as potential dependent variables in the main analysis, before evaluating egoism in terms of the alternative hypothesis (H2c: that utilitarian frames may be more effective than existence-value frames with egoistically oriented individuals).

## Chapter 4: Results

For the main study,  $n = 230$  for all analyses, unless otherwise noted. All statistical analyses were conducted with SPSS software. In most cases the  $p$ -value is provided for each statistical test, but in situations where that information is not specified, all findings of significance are at the  $p < .05$  level.

(See Appendix E for a detailed report of Study 1 results.)

### **Random Assignment Check**

ANOVAs confirmed that there were no significant differences among treatment groups in terms of age, sex, or political orientation. Although Pearson product-moment correlations indicated a weak relationship between age and treatment group, with slightly younger participants assigned somewhat disproportionately to the Five Simple Things pair ( $r = -.144$ ,  $p = .029$ ), there were no significant differences found between age and any of the dependent variables.

### **Manipulation Check**

A manipulation check was conducted to verify the frame of each PSA as referring to either the use value (utilitarian frame) or intrinsic value of nature (existence value frame). Separate ratings were reported for the frame of *the text* of the PSAs, apart from ratings of *the images* displayed in each PSA. The image information was collected to assist with interpretation of the research question added for the main study (see Chapter 2), particularly with regard to the Cliff PSA, for which the Study 1 data suggested a possible ambiguity conveyed by the explicit verbal message versus the images presented. The manipulation check was conducted with a convenience sample of eight graduate students acting as judges. The judges viewed the PSAs in pairs by issue, and then

indicated their opinions regarding the frame of each PSA on a five-point scale, from strongly disagree (1) to strongly agree (5), with (3) representing a neutral position. Also, as in Study 1, comments were requested for any thoughts that didn't "fit into the rating scheme," so that any discrepancies in the data could be better understood.

The manipulation check confirmed categorization of the two pairs of PSAs used in the experiment into utilitarian and existence value frames.<sup>4</sup> The text of the utilitarian PSAs was judged to be highlighting utilitarian benefits to the viewer ( $M = 4.14$ ,  $SD = 1.23$ ) and the text of existence value PSAs was judged to not highlight such benefits ( $M = 2.29$ ,  $SD = .825$ ); frame had a significant main effect on these responses:  $F(1, 26) = 21.970$ ,  $p = .000$ . In addition, the text of the existence value PSAs was rated as promoting benefits to natural systems ( $M = 4.29$ ,  $SD = .914$ ) while the text of the utilitarian PSAs was judged as not promoting such benefits ( $M = 2.07$ ,  $SD = 1.27$ ); frame also had a significant effect on these responses:  $F(1, 26) = 28.074$ ,  $p = .000$ . The manipulation was therefore deemed successful.

As indicated above, the judges were also asked to specifically evaluate the images in the PSAs for frame. These results are somewhat less clear-cut. Frame was predictive of the ratings on whether the images in the PSAs were promoting of benefits to natural systems ( $F(1, 26) = 8$ ,  $p = .009$ ), with the judges agreeing that the existence value PSAs generally included images promoting benefits to nature ( $M = 3.14$ ,  $SD = 1.17$ ) and that the images of the utilitarian PSAs did not promote such benefits ( $M = 2.00$ ,  $SD = .96$ ). However, although the ratings for the utilitarian PSAs were higher on the questions of whether the images promoted utilitarian benefits (utilitarian:  $M = 3.29$ ,  $SD = 1.44$ ;

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<sup>4</sup> A third pair, concerning cell phone recycling, was eliminated from the main study before data collection began, due to significant disagreement among the judges as to whether the PSA intended to represent the utilitarian frame was actually promoting a principally utilitarian message.



existence value:  $M = 2.86$ ,  $SD = 1.03$ ), this relationship was not significant ( $F(1, 26) = .824$ ,  $p = .372$ ). A closer look at the data shows that although the images were identical in the two versions of the Cliff PSA, the judges perceived those images as promoting different types of messages, depending on the accompanying text. Although they viewed both versions at the same time and could have easily detected that the images did not differ across PSAs, they reported the images in the utilitarian version of the Cliff PSA to be more promoting of utilitarian benefits ( $M = 3.71$ ,  $SD = 1.60$ ) than in the existence value version ( $M = 3.29$ ,  $SD = 1.11$ ). In addition, they reported that the existence value version of Cliff included images more promoting of benefits to natural systems ( $M = 3.14$ ,  $SD = 1.07$ ) than the images in the utilitarian version of Cliff ( $M = 2.29$ ,  $SD = 1.11$ ). As one of the judges commented, “The meaning of the images is colored by the text.”

### Main Effects

**Cliff.** Multivariate ANOVAs considering the Cliff pair of PSAs found no significant relationships between frame and the dependent variables, nor between the control group and either version of the PSA. (See Table 7.) In addition, ecocentrism and egoism post-test scores did not differ significantly between frames, nor between either frame and the control group.

Table 7. Mean scores for the Cliff PSA pair and control group.

PSA		Ecocentric Thoughts	INTENT	SURVEY	VOTE	DONATE	EMAIL	ENERGY
<b>Cliff Money</b> n = 43	Mean	1.16	13.42	3.79	3.79	3.02	2.81	4.33
	SD	1.022	2.856	.709	1.036	1.102	.906	.892
<b>Cliff More</b> n = 48	Mean	.98	13.27	3.92	3.73	2.85	2.77	4.17
	SD	1.101	2.781	.767	.962	1.031	.951	1.018
<b>Control</b> n = 48	Mean	1.06	13.77	3.79	4.00	3.17	2.81	4.52
	SD	.932	2.984	.944	.825	.953	1.024	.583

**Five Simple Things.** The results provided no support for H1a or H1b (effect on ecocentric thoughts), but partial support for H2a (intent). Multivariate ANOVAs indicated that frame predicted intent to conserve energy (ENERGY;  $F(2, 136) = 5.319, p = .006$ ) and was nearly significantly related to overall general INTENT (not including energy conservation):  $F(2, 136) = 2.789, p = .065$ . Examining the components of the INTENT index, frame was a significant predictor of both DONATE ( $F(2,136) = 3.617, p = .029$ ) and EMAIL ( $F(2, 136) = 4.474, p = .013$ ).

Post-hoc least square difference tests showed that for ENERGY, scores for those who viewed the utilitarian version of Five Simple Things ( $M = 3.91, SD = 1.23$ ) were significantly lower than for those who viewed either the existence value version of the PSA ( $M = 4.33, SD = .85$ ), or who did not view either PSA ( $M = 4.52, SD = .58$ ). For general INTENT, those who viewed the utilitarian version had significantly lower scores ( $M = 12.39, SD = 2.99$ ) than those in the control group ( $M = 13.77, SD = 2.98$ ) but not significantly lower than those who viewed the existence value version ( $M = 12.91, SD = 2.6$ ). Post hoc scores for the general INTENT index components analysis indicated that scores for DONATE were significantly lower for those who viewed either the utilitarian ( $M = 2.65, SD = 1.06$ ) or existence value ( $M = 2.76, SD = .93$ ) version of the PSA, than for those in the control group ( $M = 3.17, SD = .95$ ). Finally, for EMAIL, scores for those who viewed the utilitarian version ( $M = 2.22, SD = .96$ ) were significantly lower than both existence value version viewers ( $M = 2.64, SD = .98$ ) and those in the control group ( $M = 2.81, SD = 1.02$ ). (See Table 8 for a breakdown of mean scores and significant differences by frame.)

Table 8. Mean scores for Five Simple Things pair by treatment group. Significant differences (indicated by superscript) between groups are based on post hoc LSD tests following multivariate ANOVAs.

PSA		Ecocentric Thoughts	INTENT*	SURVEY	VOTE	DONATE*	EMAIL*	ENERGY*
<b>Five Money</b> n = 46	Mean	.80	<sup>b</sup> 12.39	3.83	3.70	<sup>b</sup> 2.65	<sup>b</sup> 2.22	<sup>b</sup> 3.91
	SD	.91	2.99	.950	.99	1.06	.96	1.23
<b>Five World</b> n = 45	Mean	.91	12.91	3.82	3.69	<sup>b</sup> 2.76	<sup>a</sup> 2.64	<sup>a</sup> 4.33
	SD	1.06	2.59	.684	.95	.93	.98	.85
<b>Control</b> n = 48	Mean	1.06	<sup>a</sup> 13.77	3.79	4.00	<sup>a</sup> 3.17	<sup>a</sup> 2.81	<sup>a</sup> 4.52
	SD	.93	2.98	.944	.83	.95	1.02	.58

Superscripts indicate significant differences at the  $p < .05$  level.

Although a multivariate ANOVA found no overall significant relationship between frame and post-test value orientation scores, post hoc LSD tests indicated a nearly significant difference ( $p = .055$ ) in ecocentrism scores between those who viewed the utilitarian version of Five Simple Things ( $M = 10.5$ ,  $SD = 5.3$ ) and those in the control group ( $M = 12.4$ ,  $SD = 4.09$ ). (See Table 9 for a summary of all main study ecocentrism scores.)

Table 9. Ecocentrism scores by treatment group.

PSA	Mean	Std. Deviation
<b>Five Money</b>	<sup>b</sup> 10.50	5.29
<b>Five World</b>	11.42	4.80
<b>Cliff Money</b>	11.91	4.98
<b>Cliff More</b>	12.02	4.57
<b>Control</b>	<sup>a</sup> 12.40	4.09

Superscripts indicate difference at the  $p = .055$  level.

### PSA Evaluations

As discussed in the Method section, participants were asked to evaluate the PSAs for likability, humor, memorability, overall tone, and promotion of self-efficacy, primarily

as a cover for the true purpose of the experiment. These evaluations were also considered in order to eliminate other possible explanations for differences in the effect of frame on the dependent variables. evaluated for significant differences among treatment groups, as well as for correlations with scores on the post-test questionnaire. Although none of the PSAs was significantly more liked than the other PSAs, there were significant differences among the PSAs in terms of the other evaluation criteria. Post hoc LSD tests indicated that both of the utilitarian versions were considered significantly funnier (Five Money:  $M = 2.39$ ,  $SD = .98$ ; Cliff Money:  $M = 2.47$ ,  $SD = 1.03$ ) than either of the existence value PSAs (Five World:  $M = 2.02$ ,  $SD = .78$  ; Cliff More:  $M = 1.75$ ,  $SD = .67$ ;  $F(3, 178) = 6.720$ ,  $p = .000$ ). In addition, the two versions of Cliff were considered significantly more negative (Cliff Money:  $M = 2.74$ ,  $SD = .95$ ; Cliff More:  $M = 2.58$ ,  $SD = .96$ ); than either version of Five Simple Things (Five Money:  $M = 3.61$ ,  $SD = .68$ ; Five World:  $M = 3.76$ ,  $SD = 1.00$ );  $F(3, 178) = 19.60$ ,  $p = .000$ ). Although overall differences for MEMORY among the PSAs only approached significance ( $F(3, 178) = 2.276$ ,  $p = .081$ ), LSD tests showed that the existence value version of Five Simple Things ( $M = 2.96$ ,  $SD = 1.15$ ) and the utilitarian version of Cliff ( $M = 2.98$ ,  $SD = 1.04$ ) were considered significantly more memorable than the existence value version of Cliff ( $M = 2.52$ ,  $SD = .90$ ). For EFFICACY ( $F(3, 178) = 10.362$ ,  $p = .000$ ), the utilitarian version of Five Simple Things ( $M = 4.28$ ,  $SD = .78$ ) was rated significantly higher than either of the Cliff PSAs (Cliff Money:  $M = 3.60$ ,  $SD = .85$ ; Cliff More:  $M = 3.12$ ,  $SD = 1.18$ ). Also, the existence value version of Cliff was rated significantly lower for EFFICACY than any of the other PSAs (including Five World:  $M = 3.89$ ,  $SD = 1.25$ ). (See Table 10 for all evaluation scores.)

Table 10. Means for evaluation criteria by PSA. Significant differences (indicated by superscript) are based on post hoc LSD tests.

PSA		LIKE	MEMORY*	FUNNY*	POSITIVE*	EFFICACY*
<b>Five Money</b>	Mean	2.89	2.67	<sup>a</sup> 2.39	<sup>a</sup> 3.61	<sup>a x</sup> 4.28
	SD	.97	.90	.98	.68	.78
<b>Five World</b>	Mean	3.16	<sup>a</sup> 2.96	<sup>b</sup> 2.02	<sup>a</sup> 3.76	<sup>x</sup> 3.89
	SD	1.13	1.15	.78	1.00	1.25
<b>Cliff Money</b>	Mean	2.95	<sup>a</sup> 2.98	<sup>a</sup> 2.47	<sup>b</sup> 2.74	<sup>b x</sup> 3.60
	SD	1.02	1.04	1.03	.95	.85
<b>Cliff More</b>	Mean	2.73	<sup>b</sup> 2.52	<sup>b</sup> 1.75	<sup>b</sup> 2.58	<sup>b y</sup> 3.12
	SD	1.09	.90	.67	.96	1.18

Superscripts indicate significant differences at the  $p < .05$  level. Letters a and b denote one group of differences, and x and y another group.

As in Study 1, LIKE was correlated significantly though weakly with several dependent variables, including general INTENT ( $r = .262, p = .000$ ), ENERGY ( $r = .228, p = .002$ ), and each of the sub-components of general INTENT (DONATE:  $r = .246, p = .001$ ; SURVEY:  $r = .220, p = .003$ ; EMAIL:  $r = .166, p = .025$ ; VOTE:  $r = .152, p = .040$ ). Also as expected, LIKE correlated positively with post-test ecocentrism ( $r = .266, p = .000$ ). Significant but weak positive correlations were also found between FUNNY and DONATE ( $r = .13, p = .009$ ) and between MEMORY and INTENT ( $r = .185, p = .013$ ), ENERGY ( $r = .164, p = .027$ ), DONATE ( $r = .210, p = .004$ ), and ecocentrism ( $r = .183, p = .013$ ). When controlling for LIKE via partial correlations, however, these relationships were found to be insignificant. In addition, a positive but weak correlation between EFFICACY and ENERGY ( $r = .201, p = .006$ ), and a weak negative correlation between EFFICACY and post-test egoism ( $r = -.164, p = .027$ ) remained significant when controlling for LIKE (ENERGY:  $r = .139, p = .062$ ; egoism:  $r = -.152, p = .042$ ).

Multivariate ANOVAs considering LIKE and frame as independent variables found a significant independent relationship between LIKE and INTENT ( $F(4, 172) = 3.510, p = .009$ ) and ENERGY ( $F(4, 172) = 2.914, p = .023$ ). Significant relationships were also found between LIKE and three of the sub-components of INTENT (DONATE: ( $F(4, 172) = 2.719, p = .031$ ); SURVEY:  $F(4, 172) = 2.731, p = .031$ ; EMAIL ( $F(4, 172) = 2.736, p = .031$ ).

### **Egoism and Frame**

To assess the alternative hypothesis (H2c) – that egoistically oriented individuals may be more receptive to utilitarian versus existence value frames in environmental appeals – those with higher than mean egoism scores on the values inventory ( $> 21$ , as in Study 1) were evaluated via multivariate ANOVA for the effect of frame on INTENT and each of the index subcomponents, as well as on ENERGY. H2c was rejected: high-egoism participants did not indicate increased intent of any type when they viewed the utilitarian version versus the existence value version of the PSAs. Specifically, for the Cliff pair ( $F(2, 68) = 3.50, p = .036$ ), post hoc LSD results indicated that the control group ( $M = 4.74, SD = .449, n = 23$ ) had a significantly higher mean on ENERGY than the existence value group ( $M = 4.12, SD = .993, n = 26$ ), while utilitarian frame scores ( $M = 4.23, SD = 1.02, n = 22$ ) did not differ significantly from either the control or existence value groups. Conversely, for the Five Simple Things pair ( $F(2, 72) = 3.875, p = .025$ ), the control group scored significantly higher on ENERGY than the utilitarian group ( $M = 4.00, SD = 1.18, n = 24$ ), while scores for the existence value group ( $M = 4.21, SD = .995, n = 28$ ) did not differ significantly from either the utilitarian or control group.

## Chapter 5: Discussion

### Summary

This study sought to evaluate the differing impacts of utilitarian and existence value frames in environmental PSAs. An exploratory first study found that frame had an independent effect on intent to indicate support for pro-environmental policies in a survey, as well as a nearly significant effect on expression of ecocentric thoughts. The main study eliminated most of the confounds that prevented firm conclusions in Study 1, and yielded some complementary findings. Most importantly, the pair of print PSAs based on the first study's Five Simple Things video PSA demonstrated that a utilitarian frame was associated with significantly lower levels of pro-environmental intent and nearly significant lower levels of ecocentrism than were reported by the control group. However, the results for the Cliff pair did not support any of the study hypotheses. Although a finding that replicated the results for Five Simple Things would have been helpful for clear interpretation of the main study results, it was anticipated, based on Study 1 findings, that the images presented in the Cliff PSA might transmit a subtextual message that belies its overtly utilitarian frame. The Cliff print PSA results therefore help to explore the research question added for the main study, which asked to what extent existence value images might supersede the impact of an explicitly utilitarian message frame. Finally, data from both Study 1 and the main study led to rejection of the alternative hypothesis, that highly egoistic individuals might be more persuaded by a PSA employing a utilitarian rather than existence value frame. Together, the data from both Study 1 and the main study provide a compelling argument against the use of purely utilitarian frames for pro-environmental messages.

## **Behavioral Intent**

Although the main study results were somewhat mixed, the significant differences between the two versions of Five Simple Things provided partial support for H2a, that an existence value message would be more effective than a utilitarian message in promoting intent to perform pro-environmental behaviors. Those who viewed the existence value version of Five Simple Things were more likely to express both intent to email an elected representative in support of a hypothetical pro-environmental policy, as well as to follow the specific recommendation to be more mindful of energy use, than those who viewed the utilitarian version. In addition, while H2b was not supported, the data indicated an interesting flip-side to its prediction that those who viewed the existence value version of the PSA would indicate higher levels of behavioral intent than those in the control group. While in most cases mean scores for the existence value group did not differ from those of the control group (except in the case of intention to donate, in which the control group indicated *higher* levels of intention than for those who viewed either version of the PSA), the utilitarian group had significantly lower scores than the control group for the general behavioral intent index, as well as for intent to email elected representatives and to conserve energy. These data strongly suggest that utilitarian frames may actually be harmful in promoting not only the specific behavior promoted by an environmental PSA, but in terms of spillover behaviors as well.

The limited disparity between mean scores for the existence value and control groups indicates that at least for these print PSAs, a single viewing was not sufficient to shift attitudes significantly in a positive direction. Several studies have observed a similar lack of movement toward adoption of the position advocated in a persuasive



appeal following a single exposure (Brewer & Gross, 2005; Sereno & Bodaken, 1972; Strasser et al, 1999; Worden & Flynn, 2002). L. Shen (2010) has offered that “repeated *and frequent* exposure to *multiple*” (p. 19) anti-smoking PSAs might be required to have a detectable positive change in attitudes, and Sereno and Bodaken (1972) have found evidence that the underlying structure of an attitude may shift before this change is detectable via common attitude measurements. In addition, the relatively high scores on several of the dependent variables for some PSAs in the first study may reflect a positive change facilitated by the perceived likability of these PSAs, as compared to those in the main study. However, since the first study lacked a control group, it is not possible to draw any firm conclusions regarding whether positive change in fact occurred.

Although the question of psychological reactance (Brehm, 1966) may arise in evaluating the reasons why, in several cases, those who viewed Five Money had lower behavioral intention scores than the control group, both versions of the PSAs used similar types of appeals and requested the same level of pro-environmental behavior change, making it difficult to explain why such reactance would have been stronger for the utilitarian group. However, the fact that those viewing either version of the PSA indicated a lower level of behavioral intent for the DONATE item than those in the control group seems to indicate some level of reactance for this measure specifically. Such a “boomerang effect” has been frequently observed in reaction to anti-smoking and other health-related advocacy (e.g., Fishbein et al., 2002; Liberman & Chaiken, 1992; Ringold, 2002). Notably, Rains and Turner (2007) have observed significantly greater reactance in response to a request to donate money or time to help address a health problem, than for actions that required less personal investment. Although their study did not consider

participant responses in the context of a control group, their findings do support the idea that the results on the DONATE measure may represent a negative reaction to the perceived magnitude of the behavior concerned, an effect that may have been exacerbated for those who had recently viewed persuasive appeals concerning a related issue.

Also, while it is possible that some qualities inherent to the existence value version somehow ameliorated a boomerang reaction on behavioral intention measures other than DONATE, the evaluation scores show that the Five Simple Things pair received statistically similar scores on liking and positive tone, while the utilitarian version was considered funnier and more promoting of self-efficacy. The only measured evaluation criterion for which the existence value version was judged significantly superior was in terms of memorability. However, both PSAs were judged to be overall not memorable, with mean scores lower than the neutral position, suggesting that Five World's higher level of judged memorability was not an important factor in mitigating any reactance that a pro-environmental message might have prompted.

The results from Study 1 provide some helpful context for the main study results. Most notably, mean scores on behavioral intention for the video version of Five Simple Things in Study 1 were generally considerably higher than for the print versions in the main study. For example, general INTENT scores for the video version of Five Simple Things was 14.55, compared to 12.91 for Five World and 12.39 for Five Money, and well exceeding the main study control group score of 13.77. The two studies did vary in other aspects, notably in terms of the filler PSAs shown and Study 1's inclusion of an open-ended statement of why protection of nature is important. This act of affirming personal

values prior to responding to a questionnaire has been linked to increased receptivity to health messages (Zhao & Nan, 2010), and may therefore have had an inflationary impact on behavioral intention responses in the Study 1 results. Alternatively, though, the fact that some video PSAs prompted increased behavioral intention scores compared to those who viewed the print PSAs in the main study may also be due to the medium itself. It is likely that the video format imparts a greater sense of “presence” than a print version (see Lombard & Ditton, 1997 for a discussion), wherein a viewer perceives an increased sense of connection to the actions portrayed in the PSA. In this regard, Slater’s (2002) extended elaboration likelihood model appears relevant, which asserts that media that are more engrossing for the audience may inhibit counter-arguing, thus leading to a decreased resistance to the advocated message. This may account, at least in part, for the generally lower INTENT scores observed in the main study, even though the print PSAs were heavily based, both in the words and images used, on their video counterparts.

Considering the variations in mean scores for the INTENT index across the two studies, results for VOTE and SURVEY, regardless of treatment group, fall somewhat narrowly within the favorable range, from a low of 3.53 (Fertilizing Water) to a high of 4.07 (Five Simple Things video) for VOTE, and from a low of 3.62 (Pickens) to a high of 4.14 (Five Simple Things video) for SURVEY. Conversely, the mean scores across all treatment groups for DONATE and EMAIL fell in the mostly neutral range, from a low of 2.32 (Fertilizing Water) to a high of 3.3 (Cliff video) for DONATE, to a low of 2.22 (Five Money) to a high of 3.31 (Five Simple Things video) for EMAIL. These data indicate that the participants were more likely, regardless of treatment group or PSA medium, to express intention to carry out hypothetical, passive actions in support of

environmental protection (indicating support on a survey or selecting a pro-environmental candidate if already planning to vote), as opposed to those that would require their active support (donating money or initiating an email).

### **Ecocentric Thoughts and Ecocentrism**

In terms of H1a and H1b, which postulated a superior impact on ecocentric thoughts for those who viewed a PSA employing an existence value frame in comparison to those viewing a utilitarian frame (H1a) and to those in the control group (H1b), the main study did not find any significant differences among the treatment groups for the ecocentric thoughts measure. Ecocentric thought was gauged via a forced ranking question in the main study, which unfortunately did not appear to have the same ability as Study 1's open-ended question to detect differences in reliance on ecocentric ideas that may have been prompted by viewing the PSAs. Therefore it is not possible to judge whether the main study PSAs were more or less effective than those used in Study 1 in promoting ecocentric thoughts or feelings, nor to use the main study control group scores for ecocentric thought as a baseline for direct comparison to Study 1 scores. However, it is interesting to note that the number of those indicating ecocentric thought in the main study (60.4% selecting ecocentric items as highest or second highest in importance) was considerably larger than those who volunteered this type of information in Study 1 (36.8%). This suggests that the question frame itself, which listed ecocentric items in equal proportion to utilitarian reasons, may have influenced the responses of participants. This type of "framing effect" prompted by survey choices has also been observed by Stern and colleagues (1993) in their studies on value orientation. It is likely then that the failure to find evidence for an effect on ecocentric thoughts was due to a testing effect

presented by the measure itself, rather than representing a lack of transmission of value frame to participants.

Although post-test ecocentrism was not originally conceived as a dependent variable, the unexpected apparent malleability of post-test ecocentrism scores in both Study 1 and the main study may give some important clues as to how a PSA's promotion (or demotion) of ecocentric ideas might mediate behavioral intent scores. As noted in the Method section, ecocentrism has routinely been used as an independent variable in studies linking value orientation to pro-environmental behavior, but has also been shown to be prone to change in response to certain stimuli (Schultz, 2000; Sevillano, Aragonés & Schultz, 2007; Berenguer, 2007, 2010). In the main study, those who viewed the utilitarian version of Five Simple Things had nearly significantly lower ecocentrism scores (at the  $p = .055$  level) than those in the control group; no other significant differences were found among treatment groups for ecocentrism. Also, as discussed above, this treatment group reported significantly lower levels of overall behavioral intent (INTENT) than the control group, and significantly lower levels of intent for both EMAIL and ENERGY than both the control and existence value version groups. A complementary finding was made in the first study, where the Five Simple Things PSA produced the highest score for ecocentrism, as well as the highest scores on every behavioral intent measure except for DONATE. These data obviously square with the literature on value orientations, which has found ecocentrism to be a consistently reliable predictor of pro-environmental behavioral intent. Also, while Study 1 saw significant differences among PSAs in terms of their individual characteristics, obfuscating the potential role of frame in promoting either ecocentrism or behavioral intent in this group

of participants, these data do suggest that behavioral intent may be mediated, at least to some extent, by promotion of ecocentrism. This interpretation however fails to account for factors other than frame that might have prompted increased ecocentrism in some treatment groups. Other participant reactions to the PSAs are therefore discussed below.

### **PSA Evaluations**

A reasonable alternative explanation for the varying effectiveness of some PSAs in the study could be that these differences were due to qualities beyond the direct transmission of ecocentric ideas. For example, it may well be that the relative success of Study 1's Five Simple Things video PSA in promoting both ecocentrism and behavioral intent is that it was simply liked more than the other PSAs, due perhaps to the use of popular and mostly young celebrities to pitch the idea of saving energy to a similarly young audience. Silvia (2006) has found that perceived similarity to someone supporting a message can eliminate reactance. In addition, liking of a PSA has long been thought to positively influence a viewer's attitude toward the brand promoted in commercial advertisements (e.g., Gardner, 1985), and has been empirically linked to increased receptivity to PSA messages on a range of topics (Nan, 2008).. Since the two best liked PSAs in Study 1 also yielded the highest scores for both ecocentrism and behavioral intention scores, it is therefore difficult to conclude that liking was not a critical factor in Study 1 results.

For the main study, however, it is easier to disentangle the effect of liking from the influence of frame. While the television PSA versions of Five Simple Things and Cliff yielded the highest scores of the Study 1 PSAs for likability (3.58 for Cliff and 3.79 for Five Simple Things), none of the print PSAs were particularly liked by main study

participants. With the exception of the existence value version of Five Simple Things, which yielded a mean score for likability just above the “neutral” position (3.16 out of 5), none of the print PSAs received favorable scores on likability, memorability, or humor. Moreover, there were no significant differences among the print PSAs for LIKE, effectively controlling for this factor in the main study. This generally neutral attitude toward the main study PSAs was not intended, and may have even had a depressive effect on the dependent variables, but it does allow us to fairly safely exclude these perceived qualities of the PSAs from the possible factors that might explain the differential effects of the Five Simple Things print pair.

Both print versions of Five Simple Things were judged to be somewhat positive in tone (3.61 for the utilitarian version and 3.76 for the existence value version), less than the mean score for the video version (4.03), but still higher than any of the other PSAs in either Study 1 or the main study. Positive tone has been associated in prior studies with decreased reactance and greater receptivity to the message offered (e.g., Brehm, 1966; Skalski, Tamborini, Glazer & Smith, 2009). However, although the Cliff print PSAs were considered negative in tone (2.74 for Cliff Money and 2.58 for Cliff More), the treatment groups viewing these PSAs indicated behavioral intent scores equal to or greater than the Five Simple Things treatment groups for almost every factor, and reported higher ecocentrism scores as well. This would suggest that PSA tone did not have an important role in impacting persuasiveness toward behavioral change or toward ecocentrism.

It is also of interest that although the two versions of Five Simple Things provided identical, specific information on actions that could be taken to conserve energy, viewers assigned higher scores for promotion of self-efficacy to the utilitarian version (mean of

4.28) than to the existence value version (mean of 3.89). Although this difference was not statistically significant, the pattern was repeated in the Cliff pair, with the utilitarian version receiving statistically higher scores on self-efficacy (mean of 3.6) than its existence value counterpart (3.12), despite the lack of specific information provided by *either* version of Cliff. This disparity on perceptions of self-efficacy likely reflects a response to the magnitude of the problem addressed by the existence value versus utilitarian PSAs. While all of the main study PSAs simply urged readers to “save energy,” the existence value versions made that entreaty in the context of changing the world (for Five Simple Things) and slowing global warming (Cliff), two goals that may well be perceived as somewhat overwhelming, and perhaps beyond the ability of a single person to address. When the same information on how to save energy is given (or not) in the context of saving money, it seems reasonable to assume that the reader would feel more capable of addressing such a manageable challenge, as opposed to personally solving large-scale environmental problems. However, regardless of this frame gap for perceived self-efficacy, this factor was not correlated with any of the main study’s dependent variables, nor with post-test ecocentrism. In fact, the versions deemed by participants to be most promoting of self-efficacy were generally associated with *lower* behavioral intent scores in the main study. In addition, the highest score for promotion of self-efficacy was associated with the lowest score for post-test ecocentrism, strongly suggesting that efficacy may not be a critical factor in promoting pro-environmental sentiment and behavior. These data also suggest that the relationship between high efficacy and higher intent and ecocentrism scores in Study 1 was likely an artifact of the



fact that the most liked PSA, Five Simple Things, was also perceived to be most promoting of self-efficacy.

**Research Question: Images versus Text (Cliff)**

The research question added for the main study was intended to specifically examine the issue of the relative effectiveness of image versus text information in the Cliff PSA. The data from the manipulation check groups in both Study 1 and the main study suggest that any ecocentric message contained in the images of the utilitarian versions of Cliff (both video and print) were not consciously perceived. However, the mean ecocentrism score for those viewing the video version of Cliff (13.21) was exceeded only by those viewing the Five Simple Things video (13.66), a difference that was not statistically significant. Additionally, the print versions of Cliff (11.91 for Cliff Money and 12.02 for Cliff More), while failing to exceed the mean score of the control group for ecocentrism (12.40), still exceeded the mean ecocentrism scores of both groups assigned to the Five Simple Things print PSAs (10.50 for Five Money and 11.42 for Five World). Overall then, the Cliff PSAs, no matter whether in video format or print, and regardless of which textual frame was used in the print versions, had a surprisingly uniformly positive impact on ecocentrism scores in comparison to the other PSAs.

In exploring this issue, it also seems relevant to consider that participant evaluations of the pair of Cliff print PSAs varied considerably, with participants finding the utilitarian version significantly more memorable, humorous, and promoting of self-efficacy than the existence value version, but that these disparities appeared to result in no corresponding impact on any of the behavioral intent measures. These data raise the interesting and related questions of (1) why participants appear to have adopted a more

ecocentric value orientation following exposure to a PSA that offered an explicitly utilitarian argument, in the case of the Cliff video PSA, and (2) why the results from the Cliff print PSA pair do not seem to vary in their effects on ecocentrism or any of the dependent variables, in the way that was observed for the Five Simple Things pair. Given that both print PSA pairs were based on well-liked video PSAs and designed to vary only in their message frames, the most likely explanation for the disparity in results between the two pairs seems to lie in the vivid imagery included in the Cliff PSAs.

The powerful role of images has been explored by several scholars. DeLuca (1999) has discussed the special nature of images as a rhetorical form that may supersede that of the written or spoken word, asserting that “audience research suggests that key images have lasting resonance while verbal frames are of little long-term impact” (p. 101). He points to work by Hall-Jamieson (1994), whose studies of political advertisements have found that audience members may absorb the images shown while discounting any countervailing message presented by a narrator. Also of relevance is Scott’s (1994) exploration of pictures in advertisements as a form of “visual rhetoric,” presenting symbolic material that is both cognitively and affectively processed by viewers. Her concept of “visual tropes” may be particularly applicable to the Cliff PSA images, which seem to fit the definition of those that are unexpected and ambiguous (i.e., why is this nice couple throwing a child’s bicycle and dollhouse off of a cliff?). Advertisements employing such “rhetorical figures” have been found to be more persuasive than those relying on more straightforward images (Tom & Eves, 1999), and Phillips and McQuarrie (2004) have argued that “richness” in imagery, such as that presented by complex, ambiguous sequences, “tends to increase the amount of

elaboration, enhance recall and to be likable in itself, while in addition promoting the formation of specific beliefs” (p. 129). Also of significance is the observation made by Hatfield, Hinck and Birkholt (2007), who have pointed out the ability of novel images to reach an audience who may have become desensitized to appeals regarding unpleasant or upsetting issues. In light of these insights, and in combination with the Cliff data from both Study 1 and the main study, it seems reasonable to presume that the images in the Cliff PSAs may have played a pivotal role in producing impacts on viewers. As Blair (1996) observes,

Many print ads that combine texts with photographs or other pictures use the text to convey an overt argument, thereby disguising the fact that the visuals serve up the affective, psychological identification, and thus do the real selling job. It's a clever shell game: suspicious of a non-rational sell, we get an (apparently) rational sell, which disarms us, thus leaving us vulnerable to the covert non-rational sell (p. 33).

Leaving aside the question of the intention of the creators of the Cliff video PSA, it would appear that the Ad Council may have achieved such an effect with its pairing of a wholly rational, materialistic spoken argument against the backdrop of destruction of childhood images in a wilderness setting.

### **Egoism and Frame**

The alternative hypothesis (H2c) was rejected. Utilitarian frames were not more persuasive for high egoism participants than existence value frames. However, while Study 1 found an interesting reverse effect, in which high egoism participants had higher SURVEY scores if they had viewed the existence value frame, in the main study the

relative effectiveness of existence value appeals was mixed. Specifically, for the Five Simple Things pair, participants who viewed the utilitarian version expressed significantly lower levels of intent to conserve energy than those in the control group, but not significantly less than those who viewed the existence value version. Conversely, results for the Cliff pair repeated the pattern found in the first study, with scores for the utilitarian version significantly lower than for the existence value version (as well as lower than the control group). Taken together, the Study 1 and main study results strongly suggest that utilitarian appeals are not more effective, and in some cases are less effective, with a more egoistic audience.

### **Theoretical Implications**

Despite this study's exploratory nature, its findings make an important contribution to framing theory, particularly in the realm of value frames. Ecocentric thoughts data from Study 1's open-ended question support the findings of many researchers (e.g., Brewer, 2002; Brewer & Gross, 2005; Shah et al., 1996; F. Shen, 2004; F. Shen & Edwards, 2005), that when an issue is presented in the context of certain values, those values are often adopted by message recipients and subsequently relied upon to evaluate the issue. Applying this concept specifically to pro-environmental messages, the data from Study 1 suggest that the use of an existence value frame can, even following a single viewing, result in an increased reliance on ecocentric concerns to evaluate the importance of environmental protection than for those exposed to a similar message framed from a utilitarian perspective. In addition, the main study results testify to the reverse effect, with a utilitarian frame having a negative impact on ecocentrism and intent to perform pro-environmental behaviors.

Another important, though originally unanticipated, finding is that frame appears to depend not only on the words used to convey a message, but also on the images presented. Although it is not possible to draw definitive conclusions based on the data presented here, results from the Cliff PSA in all of its forms (video as well as both print versions) strongly suggest that something other than verbal information was transmitting an ecocentric outlook to viewers. This observation is supported by the growing body of visual rhetoric scholarship, which may be becoming increasingly relevant as our culture continues to move away from print- and audio-only media to image-rich formats. While images have often been considered important for attracting attention to a verbal message, this study's results imply that they can have a strong impact in transmitting a message frame themselves, including one that might conflict with the "primary" verbal frame.

Finally, this study's findings provide strong support for theories of value orientation in the context of environmental psychology. Ecocentrism, whether as impacted by the PSAs or as a quality that participants carried into the study, was consistently associated with intention to carry out pro-environmental behaviors. The variations observed in this study for ecocentrism across treatment groups also suggest that this value orientation may not be firmly set, at least in the young college student sample participating in this study. This observation may have important repercussions for those studying value orientations, as well as for those investigating avenues for increasing the incidence of pro-environmental behavior.

Also in the realm of environmental psychology, the finding that the utilitarian frame PSA yielded lower scores than the control group on several measures of behavioral intent lends support to internal motivation as a more reliable predictor of pro-

environmental behavior. This coincides with findings by Deci, Kostner, and Ryan (1999) and others, which has empirically demonstrated that providing any type of reward, including an expected reward, can have a significant negative impact on one's desire to perform an activity when the reward is not provided. The corresponding negative impact of a utilitarian frame on ecocentrism observed in this study suggests a possible mediating role for value orientation in this process, with the subordination of ecocentric to more egoistic concerns prompted by the utilitarian frame's highlighting of selfish motives. This interpretation echoes the finding reported by Frantz et al. (2005), that research subjects placed in front of mirrors expressed reduced feelings of connection to nature compared to those in the less "self-aware" condition. Ecocentric values may thus be compromised when egoistic values are made salient.

Overall, this study provides evidence for the importance of values in persuasion. Although some researchers (e.g., Hunter, Levine & Sayers, 1976; Zajonc, 1980) have recognized the role of affect in attitude formation and change, and others (Sherif, Sherif, & Nebergall, 1965; Johnson & Eagly, 1989) have found that opinions regarding highly value-relevant issues are the least susceptible to change, attitude has traditionally been considered in the persuasion literature as a matter of emotionless cognition. Arguments grounded in a feeling of connection to nature may not be based in "reason", but they may indeed be cogent drivers of motivation, and their persuasive power should not be ignored. It is important to acknowledge the fact that emotional attachment is a driving force in human behavior, regardless of how "rational" the arguments may be for holding that attachment or acting upon its implications. As the environmental anthropologist Kay

Milton (2002) has opined, “without emotion there is no commitment, no motivation, no action” (p. 150).

### **Practical Implications**

Nonprofit groups and public agencies are commonly faced with very limited budgets for outreach, meaning that diagnostic pre-testing of PSAs and other materials is often infeasible. However, as the results from the main study clearly show, it is not always the case that any communication is better than no communication. In particular, PSAs emphasizing entirely utilitarian reasons for adopting environmentally friendly habits should be avoided. As well, it may not be worthwhile to invest significant resources in PSAs, even those employing an existence value frame, unless audience research incorporating control groups indicates that they can be expected to have positive impacts on behavioral intention or ecocentrism. In cases where an experimental approach to assessing PSA effectiveness is not possible, it may be helpful to at least gauge whether the PSAs are well-liked, a factor that in Study 1 was a good predictor of positive impact. Overall, it seems safe to conclude that it is not frame alone that determines a PSA’s effect. The data suggest that the topic and approach must also be engaging to the target audience. This observation would seem to apply more so in a natural environment, without a captive audience.

Based on the limited range of PSAs considered in this study, it would appear that in cases where budgets allow, a well-designed video PSA can be very effective in promoting both ecocentrism and pro-environmental behavior. Lessons from the Cliff PSA include being mindful of the subtext relayed by images in a PSA, and investing in sophisticated design expertise that can create complex, symbolic displays that both

captivate and transmit a subtle ecocentric message. As has been suggested in the context of encouraging organ donation (LaVail, Anker, Reinhart & Feeley, 2010) campaign designers should aim “to create novel appeals that will violate message recipients’ expectations about how a message will try to persuade them” (p. 65).

Overall, whether via communication campaigns, environmental education initiatives, or some other approach, it would appear that increasing ecocentrism may be a viable means for encouraging environmentally sustainable consumer behaviors, as well as spillover support for environmental policies. This is encouraging for those working to promote environmental issues, but implies a double-edge for campaign design. The apparent malleability of value orientation with regard to environmental issues means that spillover effects can also be detrimental, if a message is crafted without due attention to its possible negative impacts.

### **Limitations**

Despite this study’s interesting theoretical and practical implications, it is important to note a number of weaknesses. The most significant limitation in the main study was the failure of the ecocentric thoughts measure to detect differences between treatment groups in response to PSA frame. Comparing the results of the main study to those of Study 1, it would appear that the prompting of participants with ecocentric items in the answer choices may well have forced these ideas into the consciousness of those who would not have considered the more intangible benefits of nature in an open-ended context. The effect of presenting reasons for protecting nature thus appears to have overridden any differential influence that varying PSA frame might have had, likely preventing an accurate assessment of participants’ reliance on frame-consistent thoughts



and feelings with regard to environmental issues.

In addition, as discussed in the overview of Study 1 results, failure to adequately control for confounds significantly diminishes the ability to detect the influence of frame on the dependent variables. Although treatment pairs were developed specifically for the main study in order to minimize such confounds, there are of course differences between these treatment pairs other than frame (such as variations in language used, the length of the text, and overall approach) that could have impacted the dependent variables. As O’Keefe (2002) points out, “single-message experimental designs inevitably create some ambiguity concerning the cause of any observed differences” (p. 172). Ideally the study would have included multiple examples of each frame, matched across treatment pairs, but varying topic, tone, level of audience involvement, use of humor, etc., in order to provide a “sounder basis for generalization” (O’Keefe, 2002, p. 177) to the impacts of utilitarian and existence value frames.

In terms of the Five Simple Things print pair specifically, it is also important to note that it was not only the textual frame that varied between the pair, but also, to a small but perhaps significant extent, the image frame. Given the data from the Cliff PSAs suggesting a potentially powerful role of images in persuasion, it seems quite possible that the vibrant green Earth logo in both the Five Simple Things video PSA and its existence value print counterpart may have increased the impact of the explicitly ecocentric message. However, because the study did not include an existence value version lacking this logo, it is impossible to determine the relative effect of text and image on the main study data.

Another important limitation of the current study was the artificiality of the

experimental design, which may have significant implications for the way in which the messages in the PSAs were processed by participants. Of primary concern in this regard is the fact that the PSAs were presented for careful scrutiny in anticipation of responding to questions about them, rather than in a more natural, embedded format, in which participants were not explicitly directed to read and understand the PSAs. Multiple studies conducted in the context of the situational theory of publics (e.g., Grunig, 1983) provide substantial evidence that attention to message content is determined by both the potential reader's level of recognition that a problem exists (*problem recognition*) and that individual's attitude regarding his or her own ability to help solve the problem (*constraint recognition*).<sup>5</sup> Therefore, it is likely that many of the participants in the current study would not have absorbed the messages presented by the PSAs to the same degree (or possibly at all), had they encountered these PSAs outside of the experimental setting. The approach of the current study may thus reflect an upper-end of the potential influence of single exposure to a PSA.

In addition, because the experimental design called for a single viewing of each PSA, the study's findings regarding the relationship between frame and the dependent variables may not be an accurate predictor of the effect of utilitarian and existence value frames in everyday life. The implications of this limitation are not straightforward, since various elements in the actual media environment can impact the effect of a PSA. For example, repeated exposure to a message has been shown to increase the degree to which its frame is cognitively accessible (Chong & Druckman, 2007), suggesting that the effects

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<sup>5</sup> Grunig's theory also includes consideration of the level of personal involvement perceived by the individual with the presented issue; however involvement [although it does tend to be correlated with problem recognition (Grunig, 1997, pp. 30-31)] is predicted to influence information-*seeking* behavior rather than passive *processing* of encountered content (Grunig., 1989, p. 5).

of frame found in the current study could be magnified if the PSAs were presented on multiple occasions instead of in a single viewing. Conversely, the single exposure approach of the current study leaves aside questions about the impact of competing frames (see Chong & Druckman, 2007), which could have the reverse effect, reducing the observed impacts of viewing these PSAs in isolation.

Another limitation in the study design was its online format, which allowed participants to log on to the study Web site at any time and from any location to complete the experiment. While there would have been no particular incentive for individuals to respond to questions in an other than forthright manner, the lack of a controlled laboratory environment may have introduced unknown distractions into the experiment, and could have encouraged less attentive responses than might have otherwise been provided.

It is also important to note the narrow variability of subjects in terms of age and presumed socio-economic class. The relationship found in this study between frame and ecocentric thoughts, pro-environmental behavioral intention, and ecocentrism may not hold with a sample more representative of the general population. Certainly, the unexpected finding that ecocentrism and egoism were highly correlated in the Study 1 sample, and not negatively correlated in the main study, suggests that this group of students may not resemble an older sample in terms of the structure of value orientation and/or the stability of such value orientation. Additionally, the level of interest by topic and the type of approach that is most effective with a student group, either or both of which may have impacted the study's results, may well differ from those that would be best received by a group of older adults.

Finally, it is also not possible to gauge the effects of each PSA on participants' attitudes and intentions beyond the immediate period following viewing of the PSA. Many studies have shown that attitude can shift considerably over time, sometimes in unexpected magnitudes and directions (e.g., Kaplowitz, Fink, Armstrong & Bauer, 1986). A longer-term study, in which participants were asked for their opinions at least several weeks following exposure to the PSAs, could help to resolve this issue.

### **Future Research**

The exploratory nature of this study has introduced methodological issues that may provide guidance for future researchers, especially those aiming to gauge the effectiveness of persuasive appeals. The primary lesson may be that video PSAs, which by their nature are generally more engrossing than print PSAs, appear to be more effective at changing attitudes than their print counterparts. Although it is not possible to definitively declare the superiority of video to print outside of the experimental setting, the data from both Study 1 and the main study suggest that for a study employing single viewing of PSAs, the use of the video format may be preferable in order to evaluate the relative impacts of frame or other characteristics. In cases where the technical hurdles to controlling for confounds across video pairs are too great, another option may be to design experiments that allow for multiple exposure to the same print PSAs. This approach would also better replicate actual campaigns, which frequently rely on repeated viewings for impact, and would perhaps allow for a more sensitive gauge of potential differences in PSA effects. Further, where resources allow, a more naturalistic experiment may be best able to more realistically gauge the impacts of existence value and utilitarian frames. Such an approach would enable viewing of environmental PSAs

(preferably video), in an embedded format, multiple times over the course of several months. This approach would greatly enhance the external validity of the findings by assessing the cumulative impacts of repeated exposure to either existence value or utilitarian frames over an extended period, in the context of other competing message frames in the external media environment.

Also of relevance is the importance of selecting or designing PSAs for experimental studies with mindfulness as to the potential impact of the images presented, as opposed to text or spoken words alone. The Cliff PSA results provide a fairly convincing story of the power of images, and the fact that the message imparted by these images may not be consciously perceived. This presents special challenges for interpreting reactions to visually compelling PSAs, in whatever medium, as well as for conducting manipulation checks of frames.

Another consideration for those designing similar studies is to include measures of related behaviors, rather than limiting attitude change assessment only to the specific behavior advocated in the PSA. The results from the current study have shown that PSAs addressing a single issue may have effects that “spill over” to other related issues. When a study’s goals are consistent with the use of such proxy measures, this approach may allow for assessment of attitude change with less risk of prompting reactance or revealing the true purpose of the study. It may also provide additional insights as to the potential big-picture impacts of individual campaigns on overall movement goals.

In addition, one of the main study’s major methodological weaknesses, the apparent failure of the revised measure of ecocentric thoughts, illustrates the importance of using a metric that is appropriate to the construct. Despite the subjective nature of

judging open-ended responses, the ability to elicit participant responses in their own words, without unduly biasing them with a battery of close-ended choices, is likely essential to grasping the effects of message frame on an individual's thought process.

Finally, the current study illustrates the value of including a control group in studies evaluating PSA effectiveness. With Study 1 data alone it was impossible to determine whether a specific PSA was having a positive or negative effect on the dependent variables, or whether it was simply more or less effective than other PSAs in the experiment. The control group data in the main study provided a baseline for comparing treatment group results, allowing for detection of the negative impact of the utilitarian frame on ecocentrism scores, as well as the possible reactance invoked by the DONATE item. It also revealed that in no case was single viewing of a print PSA significantly more effective than no PSA, information of obvious import for those studying PSA impacts.

In addition to these suggestions for remedying the deficiencies in the study's approach, the results suggest several avenues for future research on the influence of frame and the effectiveness of various approaches to environmental PSAs. These include examining actual (reported) medium- and long-term behavior changes, rather than behavioral intent. A longitudinal study could include this type of measure, as well as address the issue of repetitive and competitive framing, to gauge, for example, whether repeated exposure to existence value frames in environmental PSAs might lead to stronger and/or more durable shifts toward ecocentrism and pro-environmental behavior, and to what extent competing, utilitarian frames might moderate or reverse this effect.

Also, although it was beyond the scope of the main study to explore this issue further, the Study 1 results for the Pickens PSA pose interesting questions that could be explored in future studies. Such research might investigate, for example, the degree to which merely disliking a PSA may decrease an individual's support not only for the specific issue discussed in the PSA (Nan, 2008), but also for other, related actions. It would be helpful in this regard to try to tease out the possible spillover effects of disliking of a PSA from the possible impact of a strongly non-ecocentric (either in text or subtext) argument for pro-environmental causes. Either or both of these factors could have been at play in the Pickens results, and a study which systematically varies both liking and ecocentric content, while challenging to design, might help to clarify the distinct role of each in influencing both ecocentrism and pro-environmental behavioral intention. It would also be quite relevant to examine the effects of these variables over time, to assess the durability of any negative impact on a viewer's environmental ethic, especially with repeated exposure to a disliked and/or purely utilitarian message.

## **Conclusion**

This study was intended to assess the impact of frame on ecocentric thoughts and receptivity to appeals for pro-environmental behavior. Although the Study 1 data suggest that other factors, such as liking for the PSA and relevance of the specific topic addressed, can influence its effectiveness, the overall study findings provide support for the link between promotion of ecocentrism and pro-environmental behavior, as well as the potentially adverse impact of utilitarian frames on these factors. The results also point to an understanding of frame that extends beyond the verbal, raising the possibility

that the images in a PSA might represent a more powerful message than the words themselves.

Most importantly, this study provides a hint of the ways that societal norms are transmitted via frames. A pro-environmental message cast in a utilitarian frame may seem cleverly strategic, appealing to the egoism that has become an integral part of our consumer culture. But campaigns centered on the idea that the natural world exists only as a resource base for humans (see DeLuca, 1999), or that there is no reason to protect the environment other than personal gain, serve only to further perpetuate the emotional divide between humans and nature that has arguably created the vast environmental problems that surround us. While more research is clearly needed to establish that a concerted move toward existence value appeals could successfully challenge the hegemony of the nature-as-resource concept (DeLuca, 1999), the results of this study strongly suggest that reliance on utilitarian frames may be detrimental to environmental causes, by diminishing both ecocentric values and motivation to adopt pro-environmental behaviors.



## Appendix A: Consent Form

(IRB Protocol 11-0687)

### **Project Title**

Evaluating Public Service Announcements

### **Purpose of the Study**

This research is being conducted by Dr. Linda Aldoory and Amy Zimmerling at the University of Maryland. We are inviting you to participate in this research project because you are enrolled in Communication courses at the University of Maryland and are at least 18 years of age. The purpose of this research is to study is to obtain your evaluation of several features of different types of public service announcements (PSAs).

### **Procedures**

The procedures involve viewing a group of PSAs, and responding to a short series of close-ended questions about each one. You will also be asked to provide some background information on your views regarding the issues presented in the PSAs, complete a short inventory of items assessing your general worldview, and some basic demographic questions including age, sex, and political orientation.

### **Potential Risks and Discomforts**

There are no known risks.

### **Potential Benefits**

There are no personal benefits to respondents in this research. We hope that, in the future, other people might benefit from this study through improved understanding of audience perceptions of various features of PSAs, and how these may relate to your particular worldview and specific views on the issues presented.

### **Confidentiality**

Any potential loss of confidentiality will be minimized by use of only your SONA number to identify your responses. The demographic information you provide will only be linked to your SONA number, and the researcher does not have access to your personally identifiable information. In addition, data will be stored on a password-protected computer, and print-outs will be stored in a locked file box.

If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.

### **Medical Treatment**

The University of Maryland does not provide any medical, hospitalization or other insurance for participants in this research study, nor will the University of Maryland

provide any medical treatment or compensation for any injury sustained as a result of participation in this research study, except as required by law.

**Right to Withdraw and Questions**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, Dr. Linda Aldoory at: 2367E School of Public Health, College Park, Maryland, 20742; Email: laldoory@umd.edu; Telephone: 301- 405-0388; or co-investigator, Amy Zimmerling, at 2101D Skinner Building, College Park, Maryland, 20742; Email: amyz@umd.edu; Telephone: 301-943-0840

If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:

University of Maryland College Park  
Institutional Review Board Office  
1204 Marie Mount  
College Park, Maryland, 20742  
Email: irb@umd.edu  
Telephone: 301-405-0678

This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.

Selecting “yes” below indicates that you are a least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study.

I consent to participation in this study.

- Yes
- No

## Appendix B: PSA Evaluation Questions

Please indicate your level of agreement with the following statements.

1. I liked the [nickname] PSA
2. The [nickname] PSA was funny
3. The [nickname] PSA was memorable
4. The [nickname] PSA had an overall positive tone
5. The [nickname] PSA provided specific information on actions I should or shouldn't take

## Appendix C: Study 1 Post-Viewing Questionnaire

In order to better understand your reactions to the material you just viewed, it is helpful to know something about your opinions about these issues. The videos viewed by participants in this study is varied, but **please respond to all questions presented below**, regardless of whether the videos you viewed included reference to all issues addressed by the questions.

Please respond to the following 3 questions without concern about grammar or punctuation – key words or short phrases are sufficient, but feel free to respond in whatever manner you prefer.

[Only responses to question 1 in the first section and questions 5 through 8 in the second section were analyzed.]

- 1.) Is protection of the natural environment important? Please share your views in the box below.
- 2.) People have varying views about the role of government in promoting child safety. In the box below, please express whatever seems important to you about this issue.
- 3.) In the box below, please express how important living a healthy lifestyle is (or isn't) to you personally.

Please respond to the following questions on a scale from 1 (strongly disagree) to 5 (strongly agree), with 3 representing a neutral position (i.e., you could go either way on it).

- 1.) I try to make decisions that will contribute to good health for myself and/or my family.
- 2.) When I am experiencing unusual physical symptoms, I usually consult with a doctor.
- 3.) If I witness a friend or family member experiencing unusual physical symptoms, I usually encourage that person to seek a doctor's help.
- 4.) It is important for the government to publicize health issues to protect the public.
- 5.) If I were to vote in the coming year, I would be more supportive of a candidate who supports environmental protection than one who does not.
- 6.) If I had money to donate to charity in the coming year, I would give some or all to a group supporting environmental protection (rather than to a group supporting another cause).
- 7.) If my state were considering a new policy to protect the environment, I would express my support for it if asked in a survey.

- 8.) If my state were considering a new policy to protect the environment, I would express my support for it by sending an email to my elected representative.
- 9.) Overall, laws to protect children from injury have been helpful.
- 10.) In general, most people are well-informed about how to keep their children safe.

## Appendix D: Values Inventory Post-Test

Please rate the importance of each of the following items to reflect the extent to which it represents a **guiding principle in YOUR life**, where 7 means that the statement is extremely important as a guiding principle for you and 0 mean that the item is of no importance to you. If any of the statements are opposed to your values, please circle -1.

Please consider the listed values in relationship to each other, so that **no more than a few values are rated as extremely important**.

[Note: the following questions were given in a random order to each participant.]

Authority, the right to lead or command	-1	0	1	2	3	4	5	6	7
Influential, having an impact on people and events	-1	0	1	2	3	4	5	6	7
Ambitious, focused on success	-1	0	1	2	3	4	5	6	7
Social power, control over others, dominance	-1	0	1	2	3	4	5	6	7
Wealth, material possessions, money	-1	0	1	2	3	4	5	6	7
Unity with nature, fitting into nature	-1	0	1	2	3	4	5	6	7
Protecting the environment, preserving nature	-1	0	1	2	3	4	5	6	7
Respecting the earth, harmony with other species	-1	0	1	2	3	4	5	6	7

[The first five items are based on the De Groot & Steg (2007, 2008, 2010) egoism sub-scale, with expanded language (following the commas) borrowed from Stern et al. (1998) to make the meaning of each term more clear to study participants; the current study author provided the expanded language for the *authority* item for consistency, because Stern et al. did not include this item in their short version of the Schwartz Values Inventory. The remaining items (including expanded language) are directly from Stern et al., 1998.]

## Appendix E: Study 1 Results

For Study 1,  $n = 193$  for all analyses, unless otherwise noted. All statistical analyses were conducted with SPSS software. In most cases the  $p$ -value is provided for each statistical test, but in situations where that information is not specified, all findings of significance are at the  $p < .05$  level.

### **Random Assignment Check**

A multivariate ANOVA using treatment group as the independent variable and age, sex, and politics as the dependent variables, confirmed that there were no significant differences among treatment groups in terms of the demographic variables measured. Pearson product-moment correlations also confirmed that treatment groups did not differ from each other in terms of age or sex; however, the composition of treatment groups by issue topic (energy conservation, energy policy, or lawn care) approached a statistically significant, weak difference for political orientation (Pearson's  $r = -.129$ ,  $p = .074$ ), with somewhat more of those self-identified as politically liberal being assigned to the conservation treatment groups (conservation:  $M = 3.42$ ,  $SD = 8.21$ ; lawn care:  $M = 3.12$ ,  $SD = 1.00$ ; policy:  $M = 3.14$ ;  $SD = .865$ ). Because the conservation PSAs were also positively correlated with many of the study's dependent variables, the over-representation of more liberal students in these treatment groups could present a particular problem for data interpretation. Politics was therefore added as an independent variable as part of the analysis of main effects of issue and frame, in order to control for any possible effects of this disparity on the dependent variables.

## Manipulation Check

A manipulation check was conducted to verify the frame of each PSA as referring to either the use value (utilitarian frame) or intrinsic value of nature (existence value frame). The manipulation check was conducted with a convenience sample of nine graduate students acting as judges. The judges viewed the PSAs in pairs by issue, and then indicated their opinions regarding the frame of each PSA on a five-point scale, from strongly disagree (1) to strongly agree (5), with (3) representing a neutral position. Comments were requested for any thoughts that didn't "fit into the rating scheme," so that any discrepancies in the data could be better understood.

The manipulation check confirmed categorization of the three pairs of PSAs used in the first study into utilitarian and existence value frames.<sup>6</sup> The utilitarian PSAs were judged to be highlighting utilitarian benefits to the viewer ( $M = 4.41$ ,  $SD = .747$ ) and the existence value PSAs were judged to not highlight such benefits ( $M = 2.07$ ,  $SD = 1.328$ ); frame had a significant main effect on these responses:  $F(1, 52) = 111.17$ ,  $p = .000$ . In addition, the existence value PSAs were rated as promoting benefits to natural systems ( $M = 3.85$ ,  $SD = 1.27$ ) and the utilitarian PSAs were rated as not promoting such benefits ( $M = 2.04$ ,  $SD = .898$ ); frame also had a significant main effect, though somewhat less strong, on these responses:  $F(1, 52) = 30.29$ ,  $p = .000$ .

Specifically, for the utilitarian frame PSAs, mean scores on the utilitarian benefits question ranged from 4.11 for Pickens ( $SD = .78$ ), to 4.22 for Crabs ( $SD = .83$ ) and 4.89 for Cliff ( $SD = .33$ ). For the existence value PSAs, mean scores on the utilitarian benefits

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<sup>6</sup> A fourth pair, concerning the topic of littering, was eliminated from the Study1 before data collection began, due to significant disagreement among the judges as to whether the PSA intended to represent the utilitarian frame was actually promoting a principally utilitarian message.



question ranged from 1.89 for Fertilizing Water ( $SD = .78$ ) to 2.11 for both Five Simple Things ( $SD = .93$ ) and Heat is On ( $SD = 1.05$ ). In terms of promoting benefits for natural systems, mean scores for the existence value PSAs ranged from 3.56 for Fertilizing Water ( $SD = 1.33$ ) to 3.89 for Five ( $SD = .78$ ) and 4.11 for Heat is On ( $SD = .93$ ). The Crabs PSA was viewed as somewhat promoting benefits to natural systems in addition to utilitarian benefits ( $M = 3.44$ ,  $SD = 1.42$ ), while the other two utilitarian frame PSAs were considered to not be referencing concern for the natural world: The mean scores on this question were 1.56 for Cliff ( $SD = .53$ ) and 1.22 for Pickens ( $SD = .44$ ).

Additional PSA-specific information on the rankings may be helpful in interpreting the manipulation check results. For example, a judge who disagreed that the Fertilizing Water PSA highlighted impacts to natural systems stated that there was no *explicit* reason given for adopting the recommended behavior. However, this was not an intended criterion for the existence value category, since many existence value PSAs rely on implicit versus explicit argument. In addition, one of those expressing a neutral attitude toward whether the Pickens PSA was utilitarian questioned whether national security was considered a “utilitarian” benefit. (It is, for the purposes of this study, since utilitarian frames have been defined by their focus on anthropocentric concerns.)

The current study has defined existence value PSAs as those not making explicit references to anthropocentric benefits for pro-environmental behavior. For the existence-value frame PSAs, the judges were in near-unanimous concert that these PSAs did not appeal to utilitarian concerns, with none agreeing that the Five Simple Things and Fertilizing Water PSAs did so, and only 1 of 9 judges expressing agreement (somewhat agree) that the Heat is On PSA did so. Overall, then, based on both the overall main

effect of frame and closer analysis of the ratings for individual PSAs, the manipulation was deemed successful.

### **Main Effects**

A set of 2 (frame) x 3 (topic) multivariate ANOVAs were conducted to evaluate the effects of frame (utilitarian or existence value) and topic on the major dependent variables (ecocentric thoughts and the INTENT index) and the INTENT sub-components. The results provided weak support for H1a (ecocentric thoughts) and partial support for H2a (behavioral intent). Frame had a nearly significant, independent effect on ecocentric thoughts, with 45% of participants ( $n = 80$ ) who viewed existence value PSAs expressing ecocentric thoughts versus 30.9% ( $n = 113$ ) of those viewing utilitarian PSAs;  $F(1, 187) = 3.542, p = .061$ ), as well as an independent effect on intent to express approval for pro-environmental policies in a survey (SURVEY;  $M = 4.05, SD = .73$  for existence value;  $M = 3.77, SD = .80$  for utilitarian;  $F(1, 187) = 5.464, p = .020$ ). An unexpected, nearly significant negative relationship was also found between frame and intention to donate to environmental groups, with those viewing a utilitarian PSA reporting a greater likelihood of donating to environmental organizations, than those viewing an existence value PSA (DONATE;  $M = 2.75, SD = 1.04$  for existence value;  $M = 2.94, SD = .93$  for utilitarian;  $F(1, 187) = 3.360, p = .068$ ). Topic was significantly related to INTENT ( $F(2, 187) = 3.909, p = .022$ ), DONATE ( $F(2, 187) = 6.200, p = .002$ ), and nearly significantly related to intent to email elected representatives in support of an environmental cause (EMAIL;  $F(2, 187) = 3.203, p = .053$ ). An additional multivariate ANOVA considering possible effects of frame and topic on post-test ecocentrism and egoism scores found that topic was also unexpectedly related to ecocentrism ( $F(2, 181) = 6.388, p = .002$ ).

Table 2. Mean scores for dependent variables by frame. Significant differences between frames are based on ANOVA results considering frame and topic, as indicated by superscript.

Frame		Ecocentric Thoughts <sup>^</sup>	INTENT	SURVEY*	VOTE	DONATE*	EMAIL	Ecocentrism (post-test)
<b>Utilitarian</b> n = 113	Mean	1.31	13.36	3.77	3.87	2.94	2.79	11.46
	SD	.46	2.78	.80	.87	.93	1.04	4.72
<b>Existence value</b> n = 80	Mean	1.45	13.58	4.05	3.88	2.75	2.90	12.04
	SD	.50	2.90	.73	.97	1.04	1.06	4.49

<sup>^</sup> indicates  $p = .06$ ; \* indicates  $p < .05$

Post hoc comparisons using the Tukey HSD test indicated that the mean scores for DONATE and ecocentrism were significantly higher for the conservation PSAs (DONATE:  $M = 3.18$ ,  $SD = .95$ ; ecocentrism:  $M = 13.42$ ,  $SD = 3.87$ ) than for the energy policy PSAs (DONATE:  $M = 2.77$ ,  $SD = .92$ ; ecocentrism:  $M = 10.90$ ,  $SD = 4.15$ ) and the lawn care PSAs (DONATE:  $M = 2.63$ ,  $SD = 1.01$ ; ecocentrism:  $M = 10.84$ ,  $SD = 5.44$ ).

For INTENT overall, mean scores were significantly higher for the conservation PSAs ( $M = 14.24$ ,  $SD = 2.67$ ) than for the energy policy PSAs ( $M = 13.04$ ,  $SD = 2.73$ ). Also, means scores for EMAIL were nearly significantly higher ( $p = .053$ ) for the conservation PSAs ( $M = 3.08$ ,  $SD = 1.08$ ) than for the energy policy PSAs ( $M = 2.68$ ;  $SD = 1.01$ ). (See Table 3.)

Table 3. Mean scores for dependent variables by topic. Significant differences among topics (indicated by superscript) are based on post hoc Tukey HSD tests, derived from ANOVA results considering frame and topic.

Topic		Ecocentric Thoughts	INTENT*	SURVEY	VOTE	DONATE*	EMAIL^	Ecocentrism* (post-test)
<b>Conservation</b> n = 62	Mean	1.39	<sup>a</sup> 14.24	3.97	4.02	<sup>a</sup> 3.18	<sup>a</sup> 3.08	<sup>a</sup> 13.42
	SD	.49	2.67	.75	.82	.95	1.08	3.87
<b>Lawn care</b> n = 57	Mean	1.44	13.12	3.93	3.79	<sup>b</sup> 2.63	2.77	<sup>b</sup> 10.84
	SD	.50	2.98	.70	1.00	1.01	1.04	5.44
<b>Energy policy</b> n = 74	Mean	1.30	<sup>b</sup> 13.04	3.78	3.81	<sup>b</sup> 2.77	<sup>b</sup> 2.68	<sup>b</sup> 10.90
	SD	.46	2.73	.86	.92	.92	1.01	4.15

^ indicates  $p = .053$ ; \* indicates  $p < .05$

As noted above, political preference was not significantly different between treatment groups, but bivariate correlations indicated a nearly significant over-assignment of more liberal participants to the conservation PSAs. Therefore a series of multivariate ANCOVAs were also conducted including political orientation as a covariate, along with frame and topic as independent variables. This step yielded a somewhat different picture of the relationships between the independent and dependent variables, though most relationships from the first analysis retained similar levels of significance. SURVEY was still significantly related to frame ( $F(1, 186) = 5.018, p = .026$ ), and also approaching significance for ecocentric thoughts ( $F(1, 186) = 3.224, p = .074$ ) and DONATE ( $F(1, 186) = 3.616, p = .059$ ). Topic was still significantly related to general INTENT ( $F(2, 186) = 3.035, p = .050$ ) and DONATE ( $F(2, 186) = 5.411, p = .005$ ), and approaching a significant relationship for EMAIL ( $F(2, 186) = 2.825, p = .062$ ). In addition, ecocentrism was still significantly related to PSA topic, ( $F(2, 185) = 5.328, p = .006$ ).

A series of multivariate ANOVAs considering individual PSA as the independent variable found that the specific PSA unexpectedly influenced post-test ecocentrism scores

( $F(5, 186) = 2.739, p = .020$ ) and had a nearly significant influence on ecocentric thoughts ( $F(5, 187) = 2.013, p = .079$ ). A post-hoc least square difference analysis showed significantly higher ecocentrism scores for those who viewed Five Simple Things (existence value, conservation;  $M = 13.66, SD = 3.70$ ) than for those who viewed Crabs (utilitarian, lawn care;  $M = 10.66, SD = 5.44$ ), Pickens (utilitarian, energy policy;  $M = 10.78, SD = 4.19$ ), or Heat is On (existence value, energy policy,  $M = 11.06, SD = 4.16$ ), as well as for those who viewed Cliff (utilitarian, conservation;  $M = 13.21, SD = 4.06$ ) compared to those who saw Crabs or Pickens.

The four items comprising the behavioral intent index were also examined via post-hoc least square difference analysis to gauge differential effects by specific PSA. Those who viewed the Pickens PSA indicated significantly lower intent to express support for pro-environmental policies on a survey (SURVEY;  $M = 3.62, SD = .83$ ) than those who viewed Five Simple Things ( $M = 4.14, SD = .64$ ) and Heat is On ( $M = 4.00, SD = .88$ ). (Note that the mean for the third existence value PSA, Fertilizing Water, was identical to that of the Heat is On group ( $M = 4.00, SD = .58$ ), but this treatment group had fewer participants, increasing the likelihood of a Type II error, and yielding a p-value of only .076) Also, those who viewed the Five Simple Things PSA were significantly more likely to express intent to vote pro-environmentally (VOTE;  $M = 4.07, SD = .88$ ) than those who viewed the Fertilizing Water PSA ( $M = 3.53, SD = 1.17$ ), and were also significantly more likely to indicate intent to email their elected representatives in support of environmental policies ( $M = 3.31, SD = 1.11$ ) than those viewing the Crabs ( $M = 2.74, SD = .98$ ), Pickens ( $M = 2.76, SD = 1.12$ ), or Heat is On ( $M = 2.56, SD = .84$ ) PSAs. (See Tables 4 and 5.)

Table 4. Post-test ecocentrism scores by treatment group. Significant differences (indicated by superscript) are based on post hoc least square difference tests, derived from ANOVA results.

PSA	Mean	Std. Deviation
<b>Cliff</b> (n = 33) utilitarian/conservation	<sup>x</sup> 13.21	4.06
<b>Five Simple Things</b> (n = 29) existence value/conservation	<sup>a</sup> 13.66	3.70
<b>Crabs</b> (n = 38) utilitarian/lawn care	<sup>b y</sup> 10.66	5.44
<b>Fertilizing Water</b> (n = 19) existence value/lawn care	11.21	5.56
<b>Pickens</b> (n = 41) utilitarian/energy policy	<sup>b y</sup> 10.78	4.19
<b>Heat is On</b> (n = 32) existence value/energy policy	<sup>b</sup> 11.06	4.16

Superscripts indicate significant differences at the  $p < .05$  level. Letters a and b denote one group of differences; x and y indicate another group.

Table 5. Mean scores for dependent variables by PSA viewed. Significant differences among topics (indicated by superscript) are based on post hoc LSD tests, derived from ANOVA results.

PSA		Ecocentric Thoughts	INTENT	SURVEY*	VOTE*	DONATE	EMAIL*
<b>Cliff</b>	Mean	1.30	13.97	3.82	3.97	3.30	2.88
	SD	.47	2.60	.81	.77	.85	1.02
<b>Five Simple Things</b>	Mean	1.48	14.55	<sup>a</sup> 4.14	<sup>a</sup> 4.07	3.03	<sup>a</sup> 3.31
	SD	.51	2.76	.64	.88	1.05	1.11
<b>Crabs</b>	Mean	1.45	13.34	3.89	3.92	2.79	<sup>b</sup> 2.74
	SD	.50	2.70	.76	.88	.91	.98
<b>Fertilizing Water</b>	Mean	1.42	12.68	4.00	<sup>b</sup> 3.53	2.32	2.84
	SD	.51	3.51	.58	1.17	1.16	1.17
<b>Pickens</b>	Mean	1.19	12.90	<sup>b</sup> 3.62	3.74	2.79	<sup>b</sup> 2.76
	SD	.40	2.96	.83	.94	.95	1.12
<b>Heat is On</b>	Mean	1.44	13.22	<sup>a</sup> 4.00	3.91	2.75	<sup>b</sup> 2.56
	SD	.50	2.42	.88	.89	.88	.84

Superscripts indicate significant differences at the  $p < .05$  level.

## PSA Evaluations

In order to account for impacts on the dependent variables that may have been due to factors other than frame or topic, participant evaluations of each PSA for likability, humor, memorability, overall tone, and promotion of self-efficacy were evaluated for significant differences among treatment groups, as well as for correlations with scores on the post-test questionnaire. Participants showed clear preferences for some of the PSAs (LIKE;  $F(5, 187) = 8.595, p = .000$ ). Post hoc least square difference tests showed that Pickens (utilitarian, energy policy) was significantly disliked ( $M = 2.45, SD = .82$ ) in comparison to all of the other PSAs (Cliff:  $M = 3.58, SD = .83$ ; Five Simple Things:  $M = 3.79, SD = .98$ ; Crabs:  $M = 3.34, SD = 1.10$ ; Fertilizing Water:  $M = 3.16, SD = 1.17$ ; Heat is On:  $M = 2.97, SD = 1.00$ ). In addition, Cliff (utilitarian, energy conservation) was preferred to Heat is On (existence value, energy policy), and Five Simple Things (existence value, energy conservation) was preferred to both of the other existence value PSAs, Fertilizing Water (existence value, lawn care) and Heat is On. (See Table 6 for a breakdown of mean evaluation scores for each PSA.)

Ratings of PSA memorability also varied significantly among the PSAs (MEMORY;  $F(5, 187) = 4.083, p = .002$ ), with post hoc LSD tests indicating that Five Simple Things ( $M = 3.59, SD = 1.09$ ) was considered more memorable than Pickens ( $M = 2.64, SD = .98$ ), Heat is On ( $M = 2.87, SD = .83$ ), or Fertilizing Water ( $M = 2.95, SD = 1.13$ ). Pickens was also judged less memorable than Cliff ( $M = 3.33, SD = .85$ ) or Crabs ( $M = 3.37, SD = 1.30$ ).

As expected, the PSAs also differed in terms of humor (FUNNY;  $F(5, 187) = 17.895, p = .000$ ). Post hoc LSD tests showed Crabs ( $M = 3.47, SD = 1.33$ ) to have

significantly higher mean humor scores than any of the other PSAs (Cliff:  $M = 2.52$ ,  $SD = .91$ ; Five Simple Things:  $M = 2.03$ ,  $SD = .78$ ; Fertilizing Water:  $M = 2.89$ ,  $SD = 1.15$ ; Pickens:  $M = 1.76$ ,  $SD = .76$ ; Heat is On:  $M = 1.75$ ,  $SD = .76$ ). The lawn care counterpart to Crabs, Fertilizing Water, was also considered funny, significantly more so than Pickens, Heat is On, or Five Simple Things. Cliff was also considered somewhat funnier than the two energy policy PSAs, Pickens and Heat is On.

In terms of tone (POSITIVE;  $F(5, 187) = 11.186$ ,  $p = .000$ ), LSD tests showed Five Simple Things ( $M = 4.03$ ,  $SD = .94$ ) to be perceived as significantly more positive than any of the other PSAs (Cliff:  $M = 3.27$ ,  $SD = .76$ ; Crabs:  $M = 3.29$ ,  $SD = .98$ ; Fertilizing Water:  $M = 2.95$ ,  $SD = .97$ ; Pickens:  $M = 2.62$ ,  $SD = .91$ ; Heat is On:  $M = 2.59$ ,  $SD = .86$ ). In addition, Pickens and Heat is On were considered significantly more negative than either Cliff or Crabs.

Table 6. Means for evaluation criteria by PSA. Significant differences (indicated by superscript) are based on post hoc LSD tests.

PSA		LIKE*	MEMORY*	FUNNY*	POSITIVE*	EFFICACY*
<b>Cliff</b>	Mean	<sup>a j</sup> 3.58	<sup>x</sup> 3.33	<sup>b x</sup> 2.52	<sup>b x</sup> 3.27	<sup>b</sup> 3.45
	SD	.83	.85	.91	.76	.91
<b>Five Simple Things</b>	Mean	<sup>a x</sup> 3.79	<sup>a</sup> 3.59	<sup>b k</sup> 2.03	<sup>a</sup> 4.03	<sup>a</sup> 4.03
	SD	.98	1.09	.78	.94	1.09
<b>Crabs</b>	Mean	<sup>a</sup> 3.34	<sup>x</sup> 3.37	<sup>a</sup> 3.47	<sup>b x</sup> 3.29	<sup>b</sup> 3.50
	SD	1.10	1.30	1.33	.98	1.01
<b>Fertilizing Water</b>	Mean	<sup>a y</sup> 3.16	<sup>b</sup> 2.95	<sup>b j</sup> 2.89	<sup>b</sup> 2.95	<sup>b</sup> 3.37
	SD	1.17	1.13	1.15	.97	.96
<b>Pickens</b>	Mean	<sup>b</sup> 2.45	<sup>b y</sup> 2.64	<sup>b k y</sup> 1.76	<sup>b y</sup> 2.62	<sup>b</sup> 3.17
	SD	.82	.98	.76	.91	1.08
<b>Heat is On</b>	Mean	<sup>a k y</sup> 2.97	<sup>b</sup> 2.87	<sup>b k y</sup> 1.75	<sup>b y</sup> 2.59	<sup>b</sup> 3.41
	SD	1.00	.83	.76	.86	1.07

Superscripts indicate significant differences at the  $p < .05$  level. Letters a and b denote one group of differences; j and k a second group, and x and y a third group.



Finally, for promotion of efficacy (termed as giving specific instructions for the viewer), mean scores for Five Simple Things (EFFICACY;  $M = 4.03$ ,  $SD = 1.09$ ) were significantly higher than for the other PSAs ( $F(5, 187) = 2.563$ ,  $p = .029$ ; Cliff:  $M = 3.45$ ,  $SD = .91$ ; Crabs:  $M = 3.50$ ,  $SD = 1.01$ ; Fertilizing Water:  $M = 3.37$ ,  $SD = .96$ ; Pickens:  $M = 3.17$ ,  $SD = 1.08$ ; Heat is On:  $M = 3.41$ ,  $SD = 1.07$ ).

Liking of the PSAs was weakly but significantly correlated with ecocentrism ( $r = .233$ ,  $p = .001$ ) and INTENT ( $r = .209$ ,  $p = .004$ ). The significant INTENT correlation was driven by a positive correlation between LIKE and the stated likelihood of expressing support for environmental protection in a survey ( $r = .255$ ,  $p = .000$ ). Because an ecocentric individual would be expected to like environmental PSAs more than others, partial correlations between LIKE, INTENT and SURVEY were also run, holding ecocentrism constant. This analysis yielded an insignificant correlation between LIKE and INTENT overall, but a significant though weak relationship between LIKE and SURVEY ( $r = .174$ ,  $p = .016$ ).

PSA memorability was also weakly but significantly positively correlated with SURVEY ( $r = .194$ ,  $p = .007$ ), and weakly and nearly significantly correlated with ecocentrism ( $r = .136$ ,  $p = .058$ ) and INTENT ( $r = .131$ ,  $p = .069$ ). However, a partial correlation controlling for LIKE eliminated the correlation between MEMORY and SURVEY.

Multivariate ANOVAs considering LIKE as the independent variable found significant relationships between LIKE and VOTE ( $F(4, 193) = 2.947$ ,  $p = .022$ ), SURVEY ( $F(4, 193) = 4.241$ ,  $p = .003$ ), INTENT ( $F(4, 193) = 2.976$ ,  $p = .021$ ), and

ecocentrism ( $F(4, 187) = 3.732, p = .006$ ). There was also a nearly significant relationship between LIKE and ecocentric thoughts ( $F(4, 193) = 2.258, p = .064$ ).

Multivariate ANOVAs considering LIKE, frame and topic as independent variables determined that LIKE was significantly and independently related to INTENT ( $F(4, 166) = 2.655, p = .035$ ), VOTE ( $F(4, 166) = 2.821, p = .027$ ), and, as expected, post-test ecocentrism ( $F(4, 165) = 2.813, p = .027$ ). In this analysis, the independent effect of frame on SURVEY maintained borderline significance ( $F(1, 166) = 3.787, p = .053$ ), and topic was significantly related to EMAIL ( $F(2, 166) = 3.453, p = .034$ ) and DONATE ( $F(2, 166) = 4.679, p = .011$ ). Topic was also nearly significantly related to INTENT ( $F(2, 166) = 2.931, p = .056$ ).

### **Egoism and Frame**

Finally, to assess the alternative hypothesis (H2c) – that egoistically oriented individuals may be more receptive to utilitarian versus existence value frames in environmental appeals – those with higher than mean egoism scores on the values inventory ( $> 21, n = 96$ ) were evaluated via multivariate ANOVA for the effect of frame on INTENT and each of the index subcomponents. H2c was rejected in this group of students, with a significant effect found in the opposite direction: Those with high egoism scores were more likely to indicate intent to support pro-environmental policies on a survey if they had watched an existence value PSA ( $M = 4.14, SD = .673$ ), than if they had viewed a utilitarian PSA ( $M = 3.75, SD = .801; F(1, 94) = 6.056, p = .016$ ). Examination of relationships between individual PSAs revealed that this finding was driven by differences in SURVEY between the energy policy pair ( $M = 3.67, SD = .730, n = 21$  for Pickens;  $M = 4.20, SD = .775, n = 19$  for Heat is On). Because Pickens had

been found to be significantly more disliked than Heat is On, the ANOVA was also run holding LIKE constant. This analysis failed to find a significant relationship between frame and SURVEY, and reduced the discrepancy between the high egoism viewers of Pickens and Heat is On to a nearly significant difference for SURVEY ( $p = .057$ ). No other significant relationships were found between frame and behavioral intent for high egoism participants.

## Appendix F: Print PSAs (Main Study)

### Pair 1: Cliff

Both PSAs include four full-color screen shots from the Cliff video PSA created by the Ad Council. A young couple is shown throwing what appears to be their personal property off a cliff in the wilderness, from inside of a moving van. In the first frame they are about to throw a new widescreen television, in the next frame they have just thrown a large dollhouse, in the next frame several unidentifiable items are falling, and in the final frame the dollhouse lies in pieces at the bottom of the cliff, dust rising around it.

In the **utilitarian version** of the PSA, the text reads:

*When you waste energy, you waste money*

*Throwing away money on wasted energy is like throwing away all the things you could have bought.*

*When you use less energy, you have more money for the things you want.*

*Save Energy*

*Save Money*

In the **existence value** version, the text reads:

*When you waste energy, you waste much more*

*Burning coal is the primary source for electricity production in the United States.*

*When you use less energy, you create less pollution and help to slow global warming.*

*Save energy*

*Save a lot*

## Pair 2: Five Simple Things

Both PSAs are black and white, with screen shots of four of the actors pictured in the Five Simple Things video PSA produced by WildAid. Jackie Chan is pictured in the center, holding his palm out to signify “five.” Two young actors, one male and one female, are to his left, appearing to stand behind him. The woman holds her hand in the same position as Chan. To Chan’s right, a fourth actor is pictured, also somewhat behind him. All are looking into the camera earnestly. In a small black banner along the bottom of the picture, the following text appears: “...turn off the lights...turn down the thermostat...use public transportation...take a shorter shower...bring a cloth bag...”

In the **utilitarian version** of the PSA, the text reads:

*it's easy.  
save energy.  
save money.*

*just do 5 simple things each day*

*www.5todo.org*

In the **existence value version** of the PSA, the text reads:

*it's easy to change the world*

*just do five simple things  
each day*

Super-imposed on Chan’s outstretched palm is a green hand-like shape, with an image evoking the Earth from space beneath five “fingers.” The word “today” appears alongside the Earth/hand image, and below that the web address appears:

*www.5todo.org*

## Appendix G: Main Study Post-Viewing Questionnaire

[NOTE: Only responses to question 1 in the first section and questions 5 through 8 in the second section were analyzed for the main study.]

In order to better understand your reactions to the material you just viewed, it is helpful to know something about your opinions about these issues. The videos viewed by participants in this study is varied, but **please respond to all questions presented below**, regardless of whether the videos you viewed included reference to all issues addressed by the questions.

1.) Do you believe it is important to protect nature/the environment?

[If answer is yes:]

People have varying opinions about why protection of the natural world is important. Please indicate which three of the following are most important to you, in order of their importance.

*(choices: For its own sake (intrinsic value); For the sake of preserving the beauty of nature; For the benefit of wildlife; As a source of natural resources for human society (now and in the future); For the protection of human health; To protect recreational opportunities for people)*

2.) Have you or a close friend or relative ever experienced a stroke?

[If answer is yes:]

In your experience of yourself or another suffering from stroke, please indicate which of the following you consider most important for a healthy outcome, in order of their importance.

*(choices: Recognizing the symptoms early; Fast response time by emergency personnel; adequate rehabilitative care (following the stroke); Well-trained emergency personnel)*

3.) Have you ever suffered a significant loss as a result of a natural disaster?

[If answer is yes:]

From your experience with natural disaster, please indicate which three of the following you consider to be most important for better helping people handle disasters.

*(choices: Improved warning systems; Better information about disaster preparedness; More coordinated response by local, state, and federal authorities; Improved access to long-term health services; Assistance with insurance claims)*

Please respond to the following questions on a scale from 1 (strongly disagree) to 5 (strongly agree), with 3 representing a neutral position (i.e., you could go either way on it).

- 1.) I try to make decisions that will contribute to good health for myself and/or my family.
- 2.) When I am experiencing unusual physical symptoms, I usually consult with a doctor.
- 3.) If I witness a friend or family member experiencing unusual physical symptoms, I usually encourage that person to seek a doctor's help.
- 4.) It is important for the government to publicize health issues to protect the public.
- 5.) If I were to vote in the coming year, I would be more supportive of a candidate who supports environmental protection than one who does not.
- 6.) If I had money to donate to charity in the coming year, I would give some or all to a group supporting environmental protection (rather than to a group supporting another cause).
- 7.) If my state were considering a new policy to protect the environment, I would express my support for it if asked in a survey.
- 8.) If my state were considering a new policy to protect the environment, I would express my support for it by sending an email to my elected representative.
- 9.) Overall, the government does an adequate job of providing information about preparing for natural disasters.
- 10.) In general, most people are well-informed about how to keep themselves safe during and following a natural disaster.

Please indicate how likely you are to do each of the following in the coming year.

- 1.) Be mindful of energy use
- 2.) Tell someone you know about how to recognize the symptoms of stroke
- 3.) Develop (or review an existing) disaster preparedness plan for your home

## References

- Aaker, D. A., Stayman, D. M. & Hagerty, M. R. (1986). Warmth in advertising: Measurement, impact and sequence effects. *Journal of Consumer Research*, 12, 365-381.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Allen, J. & J. Ferrand (1999). Environmental locus of control, sympathy, and pro-environmental behavior: A test of Geller's actively caring hypothesis. *Environment and Behavior*, 31(3), 338-353.
- Arnocky, S., M. Stroink & T. DeCicco (2007). Self-construal predicts environmental concern, cooperation, and conservation. *Journal of Environmental Psychology*, 27, 255-264.
- Babbie, E. (2010). *The practice of social research* (12<sup>th</sup> ed.). Belmont, CA: Wadsworth.
- Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors?: A new answer to an old question. *Journal of Environmental Psychology*, 23, 21-32.
- Bamberg, S. & G. Möser (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27, 14-25.
- Blair, J. A. (1996). The possibility and actuality of visual arguments. *Argumentation & Advocacy*, 33(1), 23-39.
- Bolsen, T. (2011). The construction of news: energy crises, advocacy messages, and frames toward conservation. *International Journal of Press/Politics*, 16(2), 143-162.



- Brehm, J. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Brewer, P. (2002). Framing, value words, and citizens' explanations of their issue opinions. *Political Communication, 19*, 303-316.
- Brewer, P. & K. Gross (2005). Values, framing, and citizens' thoughts about policy issues: Effects on content and quantity. *Political Psychology, 26*(6), 929-948.
- Cantrill, J. (1993). Communication and our environment: Categorizing research in environmental advocacy. *Journal of Applied Communication Research, 21*(1), 66-95.
- Castro, P., M. Garrido, E. Reis & J. Menezes (2009). Ambivalence and conservation behaviour: An exploratory study on the recycling of metal cans. *Journal of Environmental Psychology, 29*, 24-33.
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology, 39*, 752-766.
- Chong, D. & J. Druckman (2007). A theory of framing and opinion formation in competitive elite environments. *Journal of Communication, 57*, 99-118.
- Cialdini, R., R. Reno & C. Kallgren (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58*, 1015-1026.
- Clark, C., M. Kotchen & M. Moore (2003). Internal and external influences on pro-environmental behavior: Participation in a green electricity program. *Journal of Environmental Psychology, 23*, 237-246.

- Corraliza, J. & Berenguer (2000). Environmental values, beliefs, and actions: A situational approach. *Environment and Behavior*, 32(6), 832-848.
- Corral-Verdugo, V., R. Bechtel & B. Fraijo-Sing (2003). Environmental beliefs and water conservation: An empirical study. *Journal of Environmental Psychology*, 23, 247-257.
- Corral-Verdugo, V., G. Carrus, M. Bonnes, G. Moser & J. Sinha (2008). Environmental beliefs and endorsement of sustainable development principles in water conservation: Toward a new human interdependence paradigm scale. *Environment and Behavior*, 40(5), 703-725.
- Coulter, R. H. & Pinto, M. B. (1995). Guilt appeals in advertising: What are their effects? *Journal of Applied Psychology*, 80, 697-705.
- Davis, J. L., J. D. Green, & A. Reed (2009). Interdependence with the environment: commitment, interconnectedness, and environmental behavior. *Journal of Environmental Psychology*, 29, 173-180.
- Deci, E., R. Kostner, & R. Ryan (1999). A meta-analytic experiment examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125(6), 627-668.
- Denis, D. J. (2011). Random effects analysis of variance using SPSS: One-way between-subjects design. University of Montana Psychology Department Web site, [http://psychweb.psy.umt.edu/denis/datadecision/front/stat\\_II\\_2011/psych\\_521%20random\\_effects\\_one\\_way\\_spss.pdf](http://psychweb.psy.umt.edu/denis/datadecision/front/stat_II_2011/psych_521%20random_effects_one_way_spss.pdf)
- De Groot, J. & L. Steg (2007). Value orientations and environmental beliefs in five countries: validity of an instrument to measure egoistic, altruistic and biospheric

- value orientations. *Journal of Cross-cultural Psychology*, 38, 318-332.
- De Groot, J. & L. Steg (2008). Value orientations to explain beliefs related to environmentally significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, 40(3), 330-354.
- De Groot, J. & L. Steg (2010). Relationships between value orientations, self-determined motivational types and pro-environmental intentions. *Journal of Environmental Psychology*, 30, 368-378.
- Dawkins, R. (1976). *The selfish gene*. New York: Oxford University Press.
- DeLuca, K. (1999). *Image politics: The new rhetoric of environmental activism*. New York: Guilford Press.
- Dietz, T., P. Stern & G. Guagnano (1998). Social structural and social psychological bases of environmental concern. *Environment and Behavior*, 30, 450-471.
- Dono, J., J. Webb & B. Richardson (2010). The relationship between environmental activism, pro-environmental behaviour and social identity. *Journal of Environmental Psychology*, 30, 178-186.
- Dunlap, R. & K. Van Liere (1978). The “new environmental paradigm”: A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, 9, 10-19.
- Dunlap, R., K. Van Liere, A. Mertig & R. Jones (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425-442.
- Dutcher, D., A. Luloff & J. Johnson (2007). Connectivity with nature as a measure of environmental values. *Environment and Behavior*, 39(4), 474-493.

- Dwyer, J., H. Schroeder & P. Gobster (1991). The significance of urban trees and forests: Toward a deeper understanding of values. *Journal of Arboriculture*, 17(10), 276-284.
- Ebreo, A. & J. Vining (2001). How similar are recycling and waste reduction?: Future orientation and reasons for reducing waste as predictors of self-reported behavior. *Environment and Behavior*, 33(3), 424-448.
- Fishbein, M., K. Hall-Jamieson, E. Zimmer, I. von Haefen & R. Nabi (2002). Avoiding the boomerang: Testing the relative effectiveness of antidrug public service announcements before a national campaign. *American Journal of Public Health*, 92(2), 238-245.
- Fishbein, M. & I. Ajzen (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Frantz, C., F.S. Mayer, C. Norton & M. Rock (2005). There is no "I" in nature: The influence of self-awareness on connectedness to nature. *Journal of Environmental Psychology*, 25, 427-436.
- Gardner, M. (1985). Does attitude toward the ad affect brand attitude under a brand evaluation set? *Journal of Marketing Research*, 22(2), 192-198.
- Garling, T., S. Fujii, A. Garling & C. Jakobsson (2003). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology*, 23, 1-9.
- Gass, R. & J. Seiter (2003). *Persuasion, social influence, and compliance gaining* (2<sup>nd</sup> ed.). New York: Pearson Education.

- Grendstad, G. & D. Wollebaek (1998). Greener still?: An empirical examination of Eckersley's ecocentric approach. *Environment and Behavior*, 30(5), 653-675.
- Gross, K. & L. D'Ambrosio (2004). Framing emotional response. *Political Psychology*, 25(1), 1-29.
- Grunig, J. (1983). Communication behaviors and attitudes of environmental publics: Two studies. *Journalism Monographs* No. 81.
- Grunig, J. (1989). Sierra Club study shows who become activists. *Public Relations Review*, 15(3), 3-24.
- Grunig, J. (1997). A situational theory of publics: conceptual history, recent challenges and new research. In D. Moss, T. MacManus & D. Verčič (Eds.), *Public Relations Research: An International Perspective*. Boston: International Thomson Business Press.
- Grunig, J. & T. Hunt (1984). *Managing public relations*. Philadelphia: Holt, Rinehart and Winston.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248.
- Hart, P. (2011). One or many? The influence of episodic and thematic climate change frames on policy preferences and individual behavior change. *Science Communication*, 33(1), 28-51.
- Hatfield, K., A. Hinck & M. Birkholt (2007). Seeing the visual in argumentation: A rhetorical analysis of UNICEF Belgium's smurf public service announcement. *Argumentation and Advocacy*, 43, 144-151.

- Hinds, J. & P. Sparks (2008). Engaging with the natural environment: The role of affective connection and identity. *Journal of Environmental Psychology, 28*, 109-120.
- Hines, J., H. Hungerford & A. Tomera (1986/87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of Environmental Education, 18*(2), 1-8.
- Holstein, L. (2003, May). In defense of framing theory: Bringing hegemony back in. Paper presented at the annual meeting of the International Communication Association, San Diego, CA.
- Hunter, J., Levine, R., & Sayers, S. (1976). Attitude change in hierarchical belief systems and its relationship to persuasibility, dogmatism, and rigidity. *Human Communication Research, 3*, 3-28.
- Iyengar, S. & D. Kinder (1987). *News that matters: Television and American opinion*. Chicago: University of Chicago Press.
- Jamieson-Hall, K. (1994, September 28). Political ads, the press, and lessons in psychology. *Chronicle of Higher Education, A56*.
- Johnson, B., & Eagly, A. (1990). Involvement and persuasion: Types, traditions, and the evidence. *Psychological Bulletin, 107*, 375-384.
- Kaiser, F. (1998). A general measure of ecological behavior. *Journal of Applied Social Psychology, 28*(5), 395-422.
- Kaiser, F., M. Ranney, T. Hartig & P. Bowler (1999). Ecological behavior, environmental attitude, and feelings of responsibility for the environment. *European Psychologist, 4*(2), 59-74.

- Kaiser, F. & T. Shimoda (1999). Responsibility as a predictor of ecological behaviour. *Journal of Environmental Psychology, 19*, 243-253.
- Kals, E., D. Schumacher & L. Montada (1999). Emotional affinity toward nature as a motivational basis to protect nature. *Environment and Behavior, 31*(2), 178-202.
- Kaplan, S. (2000). Human nature and environmentally responsible behavior. *Journal of Social Issues, 56*(3), 491-508.
- Kaplowitz, S., Fink, E., Armstrong, G., & Bauer, C. (1986). Message discrepancy and the persistence of attitude change: Implications of an information integration model. *Journal of Experimental Social Psychology, 22*, 507-530.
- Karp, D. (1996). Values and their effect on pro-environmental behavior. *Environment and Behavior, 28*(1), 11-133.
- Karpiak, C. & G. Baril (2008). Moral reasoning and concern for the environment. *Journal of Environmental Psychology, 28*, 203-208.
- Kempton, W., J. Boster, & J. Hartley (1995). *Environmental values in American culture*. Cambridge, MA: The MIT Press.
- Kilbourne, W. (1995). Green advertising: Salvation or oxymoron? *Journal of Advertising, 24*(2), 7-19.
- Kollmuss, A. & J. Agyeman (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environment Education Research, 8*(3), 239-260.
- Kortenkamp, K & C. Moore (2001). Ecocentrism and anthropocentrism: Moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology, 21*, 261-272.

- LaVail, K. H., A. Anker, A. Reinhart & T. Feeley (2010). The persuasive effects of audiovisual PSAs to promote organ donation: The mediating role of psychological reactance. *Communication Studies*, *61*(1), 46–69.
- Lee, N., D. McLeod & D. Shah (2008). Framing policy debates: issue dualism, journalistic frames, and opinions on controversial policy issues. *Communication Research*, *35*(5), 695-718.
- Liberman, A. & S. Chaiken (1992). Defensive processing of personally relevant health messages. *Personality and Social Psychology Bulletin*, *18*(6), 669-679.
- Lombard, M. & T. Ditton (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication*, *3*(2). Retrieved from <http://jcmc.indiana.edu/vol3/issue2/lombard.html>
- Lynne, G., C. Casey, A. Hodges & M. Rahmani (1995). Conservation technology adoption decisions and the theory of planned behavior. *Journal of Economic Psychology*, *16*, 581-598.
- Mannetti, L., A. Pierro, S. Livi (2004). Recycling: Planned and self-expressive behaviour. *Journal of Environmental Psychology*, *24*, 227-236.
- Meyerowitz, B. & S. Chaiken (1987). The effect of message framing on breast self-examination attitudes, intentions, and behavior. *Journal of Personality and Social Psychology*, *52*(3), 500-510.
- Miller, G. R. & Hewgill, M. A. (1966). Some recent research on fear-arousing message appeals. *Speech Monographs*, *33*, 377-391.
- Milton, K. (2002). *Loving nature*. New York: Routledge.



- Monroe, M. (2003). Two avenues for encouraging conservation behaviors. *Human Ecology Review*, 10(2), 113-125.
- Moore, S., M. Murphy & R. Watson (1994). A longitudinal study of domestic water conservation behavior. *Population and Environment*, 16(2), 175-189.
- Murphy, T. (1999). The human experience of wilderness. *The Electronic Journal of Communication*, 9(2-4). Retrieved from <http://www.cios.org/EJCPUBLIC/009/2/009220.html>
- Nabi, R. (2003). Exploring the framing effects of emotion: Do discrete emotions differentially influence information processing, accessibility, information seeking, and policy preference? *Communication Research*, 30(2), 224-247.
- Nan, X. (2008). The influence of liking for a public service announcement on issue attitude. *Communication Research*, 35(4), 503-528.
- Nan, X. (2009, May). The influence of incidental discrete emotions on health risk perceptions and persuasion. Paper presented at the annual conference of the International Communication Association, Chicago, IL.
- Nash, R. (1989). *The rights of nature: A history of environmental ethics*. Madison, Wisconsin: University of Wisconsin Press.
- Nelson, T., R. Clawson & Z. Oxley (1997). Media framing of a civil liberties conflict and its effects on tolerance. *American Political Science Review*, 91(3), 567-583.
- Nelson, T., Z. Oxley & R. Clawson (1997). Toward a psychology of framing effects. *Political Behavior*, 19(3), 221-246.

- Nisbet, E., J. Zelenski, J., S. Murphy (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior*, 41(5), 715-740.
- Nordlund, A. & J. Garvill (2002). Value structures behind proenvironmental behavior. *Environment and Behavior*, 34(6), 740-756.
- O'Keefe, D. (2002). *Persuasion: Theory and research* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- O'Keefe, D. (2003). Message properties, mediating states, and manipulations checks: Claims, evidence, and data analysis in experimental persuasive message effects research. *Communication Theory*, 13(3), 251-274.
- Osbaldiston, R. & K. Sheldon (2003). Promoting internalized motivation for environmentally responsible behavior: a prospective study of environmental goals. *Journal of Environmental Psychology*, 23, 349-357.
- Pelletier, L., S. Dion, Tuson, K., & I. Green-Demers (1999). Why do people fail to adopt environmental behaviours? Towards a taxonomy of environmental amotivation. *Journal of Applied Social Psychology*, 29, 2481-2504.
- Petty, R. & J. Cacioppo (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality and Social Psychology*, 37(10), 1915-1926.
- Petty, R. & J. Cacioppo (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.
- Petty, R., C. Haugtvedt & S. Smith (1995). Elaboration as a determinant of attitude strength: Creating attitudes that are persistent, resistant, and predictive of behavior.

- In R. Petty & J. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 93-130). Mahwah, NJ: Erlbaum.
- Phillips, B. & E. McQuarrie (2004) Beyond visual metaphor: A new typology of visual rhetoric in advertising. *Marketing Theory, 4*, 113-136.
- Pinto, M. B. & Priest, S. (1991). Guilt appeals in advertising: An exploratory study. *Psychological Reports, 69*, 375-385.
- Pooley, J.A. & M. O'Connor (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment and Behavior, 32(5)*, 711-723.
- Price, V., D. Tewksbury & E. Powers (1997). Switching trains of thought: The impact of news frames on readers' cognitive responses. *Communication Research, 24(5)*, 481-506.
- Rains, S. & M. M. Turner (2007). Psychological reactance and persuasive health communication: A test and extension of the intertwined model. *Human Communication Research, 33*, 241-169.
- Ringold, D. J. (2002). Boomerang effects in response to public health interventions: Some unintended consequences in the alcoholic beverage market. *Journal of Consumer Policy, 25*, 27-63.
- Saunders, C. (2003). The emerging field of conservation psychology. *Human Ecology Review, 10(2)*, 137-149.
- Scheufele, D. (1999). Framing as a theory of media effects. *Journal of Communication, 49*, 103-122.

- Schroeder, H. (1992). The spiritual aspect of nature: A perspective from depth psychology. In: *Proceedings of the 1991 Northeastern Restoration Research Conference, April 8, Saratoga Springs, NY*. General Technical Report NE-160. Radnor, PA: USDA Forest Service, Northeastern Experiment Station, 25-30.
- Schultz, P. W. (2000). Empathizing with nature: The effects of perspective taking on concern for environmental issues. *Journal of Social Issues, 56*(3), 391-406.
- Schultz, P. W. (2001). The structure of environmental concern: concern for self, other people, and the biosphere. *Journal of Environmental Psychology, 21*, 327-339.
- Schultz, P.W. & L. Zelezny (2003). Reframing environmental messages to be congruent with American values. *Human Ecology Review, 10*(2), 126-136.
- Schultz, P.W. & L. Zelezny (1998). Values and pro-environmental behavior: A five-country survey. *Journal of Cross-Cultural Psychology, 29*(4), 540-558.
- Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology, 10*, 221-279.
- Schwartz, S.H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology, 25*, 1-65.
- Scott, L. (1994). Images in advertising: The need for a theory of visual rhetoric. *Journal of Consumer Research (21)*, 252-273.
- Sereno, K. & E. Bodaken (1972). Ego-involvement and attitude change: Toward reconceptualization of persuasive effect. *Speech Monographs, 39*(3), 151-158.
- Shah, D., D. Domke & D. Wackman (1996). "To thine own self be true: Values, framing, and voter decision-making strategies. *Communication Research, 23*(5), 509-560.

- Shen, F. (2004). Effects of news frames and schemas on individuals' issue interpretations and attitudes. *Journalism & Mass Communication Quarterly*, 81(2), 400-416.
- Shen, F. & H. H. Edwards (2005). Economic individualism, humanitarianism, and welfare reform: A value-based account of framing effects. *Journal of Communication*, 55(4), 795-809.
- Shen, L. (2010). The effect of message frame in anti-smoking public service announcements on cognitive response and attitude toward smoking. *Health Communication*, 25, 11-21.
- Sheppard, B., J. Hartwick & P. Warshaw (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modification and future research. *Journal of Consumer Research*, 15, 325-343.
- Sherif, C., Sherif, M., & Nebergall, R. (1965). *Attitude and attitude change: The social judgment approach*. Philadelphia, PA: Saunders.
- Silvia, P. (2006). Deflecting reactance: The role of similarity in increasing compliance and reducing resistance. *Basic and Applied Social Psychology*, 31, 9-16.
- Singhapakdi, A. & M. La Tour (1991). The link between social responsibility orientation, motive appeals, and voting intention: A case of an anti-littering campaign. *Journal of Public Policy & Marketing*, 10(2), 118-129.
- Skalski, P., R. Tamborini, E. Glazer, & S. Smith (2009). Effects of humor on presence and recall of persuasive messages. *Communication Quarterly*, 57(2), 136-153.
- Slater, M. (2002). Entertainment-Education and Elaboration Likelihood: Understanding the Processing of Narrative Persuasion. *Communication Theory*, 12(2), 173-191.

- Sneegar, R. (2006). Egoistic, altruistic, and biospheric environmental concerns: Measurement and structure. *Journal of Environmental Psychology, 26*, 87-99.
- Stern, P. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56(3)*, 407-424.
- Stern, P. & T. Dietz (1994). The value basis of environmental concern. *Journal of Social Issues, 50(3)*, 65-84.
- Stern, P., T. Dietz, T. Abel, G. Guagnano & L. Kalof (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Research in Human Ecology, 6(2)*, 81-94.
- Stern, P., T. Dietz & L. Kalof (1993). Value orientations, gender, and environmental concern. *Environment and Behavior, 25(3)*, 322-348.
- Stern, P., T. Dietz, L. Kalof & G. Guagnano (1995). Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology, 25(18)*, 1611-1636.
- Story, P. & D. Forsyth (2008). Watershed conservation and preservation: Environmental engagement as helping behavior. *Journal of Environmental Psychology, 28*, 305-317.
- Strasser, A., J. Cappella, C. Jepson, M. Fishbein, K. Tang, E. Han & C. Lerman (2009). Experimental evaluation of antitobacco PSAs: Effects of message content and format on physiological and behavioral outcomes. *Nicotine & Tobacco Research, 11(3)*, 293-302.
- Taylor, S. & P. Todd (1997). Understanding the determinants of consumer composting behavior. *Journal of Applied Social Psychology, 27*, 602-628.

- Thompson, S. & M. Barton (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology, 14*, 149-157.
- Thøgersen, J. & F. Ölander (2003). Spillover of environment-friendly consumer behavior. *Journal of Environmental Psychology, 23*, 225-236.
- Thøgersen, J. & F. Ölander (2006). To what degree are environmentally beneficial choices reflective of a general conservation stance? *Environment and Behavior, 38(4)*, 550-569.
- Tietenberg, T. (1992). *Environmental and natural resource economics* (3<sup>rd</sup> ed.). New York: Harper Collins.
- Tom, G. & A. Eves (1999). The use of rhetorical devices in advertising. *Journal of Advertising Research, 39-43*.
- Turner, M. M. (2007). Using emotion in risk communication: The anger activism model. *Public Relations Review, 33*, 114-119.
- Valkenberg, P., H. Semetko & C. De Vreese (1999). The effects of news frames on readers' thoughts and recall. *Communication Research, 26(5)*, 550-569.
- Van Liere, K. & R. Dunlap (1978). Moral norms and environmental behavior: An application of Schwartz's norm-activation model to yard burning. *Journal of Applied Social Psychology, 8(2)*, 174-188.
- Vining, J. (1992). Environmental emotions and decisions: A comparison of the responses and expectations of forest managers, an environmental group, and the public. *Environment and Behavior, 24(1)*, 3-34.
- Vining, J. & A. Ebreo (1989). An evaluation of the public response to a community recycling education program. *Society and Natural Resources, 2*, 23-36.

- Vining, J. & A. Ebreo (2002). Emerging theoretical and methodological perspectives on conservation behavior. In R. Bechtel & A. Churchman (Eds.), *The new handbook of environmental psychology* (pp. 541-558). New York: Wiley.
- Vining, J. & Tyler, E. (1999). Values, emotions and desired outcomes reflected in public responses to forest management plans. *Research in Human Ecology*, 6(1), 21-34.
- Weaver, D. (2007). Thoughts on agenda setting, framing, and priming. *Journal of Communication*, 57, 142-147.
- Werder, K. & A. Schuch (2008, May). Communicating for social change: An experimental analysis of activist message strategy effect on receiver variables. Presented at the International Communication Association Annual Meeting, Quebec.
- White, K., R. MacDonnell & D. Dahl (2011). It's the mind-set that matters: The role of construal level and message framing in influencing consumer efficacy and conservation behaviors. *Journal of Marketing Research*, 48, 472-485.
- Wilson, E. O. (1988). *Biodiversity*. Washington, DC: National Academy Press.
- Wilson, E. O. (2002). *The future of life*. New York: Vintage Books.
- Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, 59, 329-346.
- Worden, J. & B. Flynn (2002). Using mass media to prevent cigarette smoking. In R. C. Hornick (Ed.), *Public health communication: Evidence for behavior change* (pp. 23-34). Mahwah, NJ: Erlbaum.
- World Wildlife Fund-UK (2009). Simple and Painless?: The limitations of spillover in environmental campaigning. [www.wwf.org.uk/strategiesforchange](http://www.wwf.org.uk/strategiesforchange)



- Yan, C., J. Dillard & F. Shen (2010). The effects of mood, message framing, and behavioral advocacy on persuasion. *Journal of Communication, 60*, 344-363.
- Zajonc, R. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35*(2), 151-175.
- Zelezny, L., P. Chua & C. Aldrich (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues, 56*(3), 443-457.
- Zhao, X. & X. Nan (2010). Influence of self-affirmation on responses to gain- versus loss-framed antismoking messages. *Human Communication Research, 36*(4), 493-511.