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How do American's think about the enviornment and what does it mean for public policy: A re-assessment

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HOW DO AMERICANS THINK ABOUT THE ENVIRONMENT AND

WHAT DOES IT MEAN FOR PUBLIC POLICY: A RE-ASSESSMENT.

A Thesis

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Abstract

Research within the social sciences has attempted to explain what individuals perceive, why they perceive it the way that they do and what are their attitudes, intentions and behavior. This issue is at the root of the contention that surrounds many environmental issues, with individuals worrying about some risks that dramatically exceed the danger they actually pose while ignoring others. Moreover, this fact of the non-rational element in policy decision-making has led researchers to study how to effectively communicate with a public that is emotionally driven. Using the 2010 General Social Survey, this paper attempts to re-assess the bases of environmental concern and why it matters for public policy. This paper highlights the significance of social psychological factors in influencing environmental attitudes, intentions and behavior and how policy decision makers can benefit through a localized discourse when communicating risks or formulating public policy.

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CHAPTER ONE: INTRODUCTION

The purpose of this study is two-fold: to examine the social structural and social psychological bases of environmental attitudes, intentions and behavior in the U.S. in 2010 as well as its influence on regulatory and policy decision-making. Increasingly, government decision-makers must understand what individuals perceive, why they perceive it the way that they do, and what are their attitudes, intentions and behavior. Moreover, government and experts need to effectively communicate policy decisions to an emotionally driven public. This process was articulated succinctly by U.S. Supreme Court Justice Stephen Breyer in his lecture, "Breaking the Vicious Cycle: Toward Effective Risk Regulation." Justice Breyer points out how public perceptions drive the U.S. Congress; Congress enacts guidelines for regulators and administrators; and regulations guide public perceptions (Breyer, 1993). Thus, this vicious cycle is underscored by the difficulty of balancing scientific analysis, political pressures, and an emotionally driven public in a world of rapidly changing technology and risks. Moreover, public perceptions are deeply embedded in our governing mechanisms. This study seeks to identify some of the contributing factors that influence this process and to make recommendations on how our governing institutions can more effectively work with citizens to communicate risk and strengthen environmental policy.

While this cyclical process may be evident to any individual familiar with how the American political system *ought* to work, it does not fully describe what actually happens. For example, public opinion polls show that many citizens do not put faith in our elected officials or governing institutions due to a lack of transparency. Additionally, there have been group-specific declines in public trust in science (Gauchat, 2012). Therefore, it is ironic that while the public may not trust government institutions, nor the supporting science, both are seen as the most responsible for the causes and therefore for solving the problems (Wildavsky, 1979).

In the environmental field, there exists polarization and contention about the impact of environmental risks due to the fact that individuals tend to only respond to those that they can perceive (Slovic et al., 1979). Moreover, numerous studies have suggested that there is an inherent gap between individuals' environmental attitudes, intentions and behavior, and the influence of internal, external, and situational factors (Kollmus & Agyeman, 2002). Lastly, many past studies have sought to identify who fears what and why, and in so doing, attempt to understand in what way our governmental institutions can more effectively assess, manage, and communicate risk and reward (or cost and benefit) information to citizens.

The Human Element

Past literature in cognitive psychology also points to the fact that the public misperceives many environmental and technological risks. Many of us are more concerned with some risks than the evidence warrants (e.g. pesticides, genetically modified foods, nuclear radiation), and less concerned with risks that pose significant dangers (e.g. climate change and particulate pollution). Contributing to this perception is partly due to the fact that individuals rely on judgmental rules, or heuristics, to reduce what is a difficult mental task into simpler terms. As such, when fact and values must be balanced, it is usually values which drive our intentions and behavior.

Likewise, literature in the fields of sociology and anthropology reveal that individuals use orienting dispositions, or worldviews, to make sense out of complex information (Douglas & Wildavsky, 1982). They posit that mental frameworks are not solely models of individual cognition, but correspond to deeply held values and beliefs regarding society, its functioning, and its potential fate. What is evident is that individuals act within the framework of bounded rationality, making decisions based on limited information.

The reality of the human element in public policy decision-making requires acknowledging the limits of public rationality. Moreover, effective democratic governance is grounded in the transmission of

information between professionals and the public, known as risk communication. As the field of risk communication has grown over the last several decades, this process has evolved into not just the movement of information, but debate and participation. Therefore, public concerns and judgments are a fundamental aspect of risk regulation and environmental policy. However, to what extent is the relationship between the two groups sufficient? Is the goal to transfer information to create a more informed citizenry? Should governing institutions not just inform, but influence, behavior? While the goal of risk communication seeks to bridge the gap between public and professional risk perception, its intended purpose remains the same: developing an environmental ethic that seeks expertise based solutions to mutually defined problems (O'Leary et al., 1999).

Empirical Analysis

This study will look to further develop insight into the behavioral and social aspects of environmental concern based on the following: (a) An empirical analysis examining environmental attitudes, intentions and behavior in the U.S. in 2010 as a re-assessment of the study by Dietz et al. (1998) and (b) current regulatory implications based on these findings. This analysis will seek to further explain the human element in the regulatory process and further elaborate on the context in which individuals develop concern for the environment based on the following:

general worldviews and ideology about humanity and the environment; specific attitudes, beliefs and cognitions about environmental issues; and environmentally relevant behavior and intentions. Overall, this analysis will highlight the growing importance of social psychological factors in influencing our attitudes, intentions and behavior related to the environment.

CHAPTER 2: THE BASES OF ENVIRONMENTAL CONCERN

Understanding public perceptions and how they influence intentions and behavior is a fundamental component of effective policy decision-making. Moreover, understanding how individuals perceive their own and collective relationship with the environment, evaluate risk and analyze choices is imperative towards more effective public policy and a more informed public. This chapter will explain the two main streams of research that have developed to explain environmental concern: social structural explanations of environmental concern and social psychological influences of environmental concern.

Social Structural Influences

Social structural influences have been examined extensively by researchers in their connection to environmentalism. Also called socio-demographic variables, these variables represent common structures between various social positions. These studies share, and have expanded upon, many common hypotheses about what influences environmental attitudes, intentions, and behavior.

The strongest predictors of environmental attitudes have been age and years of education. Studies have suggested that younger individuals were more likely to have reported engaging in environmental behaviors than older individuals (Hines et al., 1986). Other studies found that age/cohort effects are stronger predictors than period effects, with the more recent cohorts being more environmentally conscious (Kanagy, Humphrey & Firebaugh, 1994; as cited in Dietz et al., 1998). Likewise, more years of education led to an increase in knowledge about environmental issues, yet not to an increase in environmental behavior (Kollmus & Agyeman, 2002).

Other factors such as race and gender have been less consistent, but still utilized in several studies. Studies have found that blacks have a greater concern for the environment than whites relative to other public issues. However, blacks are less likely to say that they will take political

action on these issues since many other issues compete for their time and resources (Mohai, 1990).

The relationship between gender and concern for the environment has been studied the most extensively in comparison to the other social structural variables (Stern et al., 1993). Overall, women are generally found to be more concerned than men. One theory involves aspects of parenthood (Hamilton, 1985; as cited in Dietz et al., 1998). It is generally assumed that maternity motivates women to be more conscious of the harmful effects posed by environmental hazards. Other theories have included labor force participation and ethical socialization (Blocker & Eckberg, 1997; Stern et al., 1995). Additionally, studies found that women usually have less extensive environmental knowledge than men, but are more emotionally engaged, show more concern about environmental destruction, believe less in technological solutions, and are more willing to change their behavior (Lehman, 1999; as cited in Kollmus & Agyeman, 2002). However, other studies have found gender to have no significant association with environmental attitudes (Hines et al., 1986).

Religion also has been extensively examined in relation to environmental attitudes. Most of the research in this area has found a weak-negative relationship between environmentalism and identity with a religious sect (Hand & Van Liere, 1984). Political ideology and party

identification are also associated with social structural influences of environmental attitudes. Generally, it has been found that the more liberal and Democratic leaning an individual is, the more likely he or she is to have increased environment conscious attitudes, and more likely to engage in environmental intentions and behavior.

Social Psychological Factors

The other stream of research studies has linked environmentalism to social psychological factors such as attitudes, beliefs, values and worldviews. These are generally factors related to personality characteristics, including the perceptions that individuals have of themselves and others (Hines et al., 1986). Generally, each of these broad values and attitudes are predictive of specific ones, and that the most important social psychological factor depends upon the specific behavior (Ajzen & Fishbein, 1980).

Economic orientation behavior refers to an individual's cost consciousness and concern about the economic impacts of certain responsible environmental behaviors and/or regulations (Hines et al., 1986). Research studies examining willingness-to-pay for public goods have found that making a personal contribution of money, support for political action, and rating the importance of a problem are measurements of how important the issue is to the individual (Kahneman, 1993). Thus, this subjective preference is often driven by the

values one associates to that given action. Additionally, willingness-to-pay is more likely when human, rather than natural harm is the source. However, when human action is the cause of the problem, intent is important. For example, intentional harm inflicted by arsonists is more upsetting than pesticide runoff. Conversely, when the cause of the harm is natural, surprise is important: unexpected disasters (drought) are more upsetting than the process of natural decay.

Locus of control represents an individual's perception of whether or not he or she has the ability to bring about change through his or her own behavior. This includes external locus of control – attribute change to forces beyond yourself – and internal locus of control – believe that your activities are likely to have an impact. Other internal factors including motivation, environmental knowledge and awareness, values, and emotional involvement are frequently referenced in the social psychological literature.

Motivation, defined as the reason for a behavior or a strong stimulus around which behavior is organized, is influenced by primary motives, the larger motives that let us engage in a whole set of behaviors (e.g. such as altruistic and social values), which are often covered up by the more immediate, selective motives, that evolve around one's own needs (e.g. being comfortable, saving money and time). These motives

can be influencedby a willingness to act based on knowledge or values, or are the result of the formation of habit.

Most researchers agree that environmental knowledge is not a significant predictor of environmental behavior. Likewise, people with high levels of environmental awareness may not be willing to make bigger lifestyle sacrifices, but may be more willing to accept political changes that will enhance pro-environmental behavior such as higher fuel taxes or more stringent building codes (Diekman & Frazen, 1996; Lehman, 1999; as cited in Kollmus & Agyeman, 2002). However, environmental awareness, which has both a cognitive knowledge base and an affective perception base, has more predictive ability.

Values shape much of our intrinsic motivation and are significantly influenced by our immediate social net (Fuherer et al., 1995; as cited in Kollmus & Agyeman, 2002). Emotional involvement is the extent to which we have an affective relationship with the natural world. It is seen to be important in shaping our beliefs, values, and attitudes towards the environment. Moreover, experiential factors including affect, imagery, and values strongly influence risk perception and support for environmental policy issues (Leiserowitz, 2006). Other studies have examined acceptance of postmaterialist values as a means of ideology (Dunlap & Mertig, 1995, 1997). Postmaterialism is defined as a value orientation towards self-expression and quality of life over economic and

physical security. It has generally been found that acceptance of postmaterialistic values is positively associated with a general concern for the environment.

Understanding the bases of environmental concern has generally focused on how social structural - common structures between social positions - and social psychological variables- how thoughts, feelings, and behaviors are influenced by others - influence our attitudes, intentions and behavior. Through the previous research findings, researchers have established several theoretical frameworks to outline the process through which these variables operate.

Theoretical Paradigms

Two of the main theoretical paradigms established in the environmental behavior field include the norm-activation model (Schwartz, 1977) and the theory of planned behavior (Ajzen & Fishbein, 1980). The basic premise of the norm-activation model is that moral or personal norms are direct determinants of pro-social behavior. Norm-activation depends on ascription of responsibility to the self for the undesirable consequences to others. These norms are caused by cognitive variables (e.g. awareness and knowledge about environmental problems), emotional (e.g. values and beliefs) and social (e.g. one's own behavior should will follow social norms). Ultimately, this theory

emphasizes beliefs about responsibility for causing or ability to alleviate threats to any valued object.

The other theoretical paradigm, the theory of planned behavior, is based on the rational evaluation of behavioral consequences and the normative beliefs concerning the prescription of others (Fig. 1). As such, attitudes influence behavioral intention, which influences behavior. Moreover, this theory stresses the importance of situational constraints when forming behavioral intention. It was found that in order to find a high correlation between attitude and behavior, the researcher had to measure the specific attitude toward that particular behavior. For example, it has been found that measuring ones attitude towards climate change is a poor predictor of driving habits. A more specific attitude measurement would lead to a higher correlation, but may lose the context of what was being asked (Kollmuss & Agyeman, 2002). Moreover, this theory relied on the assumption that people make systematic use of information available to them and are not controlled by unconscious motives or overpowering desire. Ultimately, individuals maximize utility to balance cost and benefit in their interest. Most researchers followed this model despite its assumption of rationality since the model was simple, clear, and provided a mathematical equation for testing.
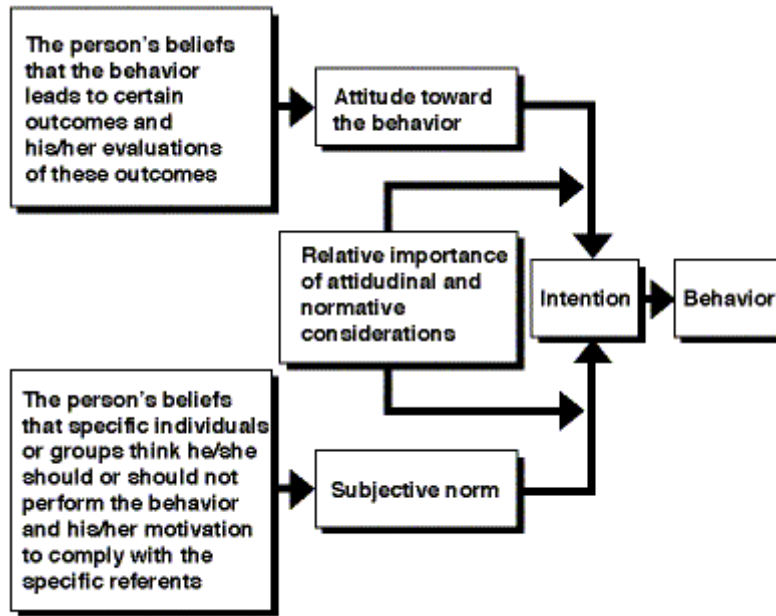
Figure 1. **Conceptual representation of the Theory of Reasoned Action. As presented in "Understanding Attitudes and Predicting Social Behavior" (Ajzen and Fishbein, 1980).**

While both of these models provide insights into pro-environmental behavior, they fail to account for the fact that people often are greatly influenced by their cognitive architectures and the complexity of the environment in which they make decisions (Jones, 2002). As Herbert Simon states in his book *Administrative Behavior*, "rationality does not determine behavior...instead behavior is determined by the irrational and non-rational elements that bound the area of rationality" (Simon, 1945; p. 241). Essentially, we are bounded to make decisions based on the information that we have. In his B*ehavioral Theory of Choice*, Simon outlines the principles of bounded rationality: A "long term" memory allows individuals to encode experiences into rules that respond to stimuli. Similarly, a "short term memory" categorizes features as relevant

or irrelevant. Next, individuals are significantly driven by emotion, which enables them to weigh how they respond to stimuli. For example, deeper concentration and thinking would be used when attention and emotion are aroused. If not, individuals are likely to rely on heuristics, or other orienting dispositions, to make sense out of the situation. Most individuals rely on this quick thinking and processing mechanism rather than on a deeper processing of evaluating facts and balancing values. Lastly, emotion enables us to identify with solutions encoded in memory, which individuals become attached to and thus rely on when faced with complex decisions.

While this theory only partly explains why individuals behave the way they do, it further underscores the bases for emotionally driven behavior under uncertainty. Moreover, this theory highlights the notion that individuals respond differently to stimuli based on their cognitive type, thus underscoring how concepts of risk mean different things to different people.

Psychometric Paradigm

A growing field of literature in cognitive psychology has examined public risk-perception and decision-making (Slovic, Fischhoff, & Lichtenstein, 1977; Slovic, Fischhoff, & Lichtenstein, 1979; Fischhoff, Lichtenstein, Slovic, Derby, & Keeny, 1981; Slovic, 1987; Tversky & Kahneman, 1981). According to Slovic et al. (1977, 1979), their

empirical testing demonstrated that two main factors influence individual

risk perception: *the dread risk factor*, which includes factors such as

calm-dread, voluntary-involuntary, controllable-uncontrollable, and

catastrophic-not catastrophic attributes of risks; and the *unknown risk*

factors, known-unknown to the individual, known-unknown science, and

new-old attributes of risk. Thus, we find risks more acceptable that

present low measures of dread and are more familiar to us. In each of

these cases, the subjective process of balancing our emotion and

cognition allows us to make difficult choices quickly, often ignoring the

facts.

In one of their most well known studies, Slovic et al. (1979)

examined how educated lay people estimated 41 causes of death in the

U.S (Fig 2.). First, while individuals had a good idea of the frequency of

most causes of death, they tended to underestimate the differences in the

likelihood of the most and least frequent causes of death. Likewise, they

overestimated the relative likelihood of those causes of death that are

unusually visible, sensational, and easy to imagine (e.g. homicides and

accidents) (Slovic et al., 1979; Fischoff et al., 1981).
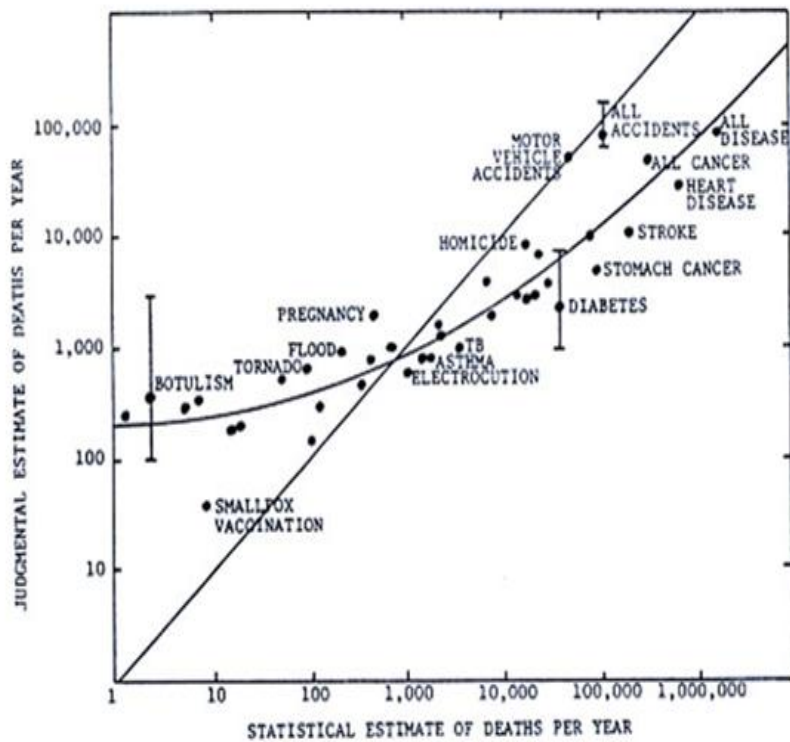
Figure 2. **Relationship between judged frequency and the actual number of deaths per year for 41 causes of death. If judged and actual deaths were equal, the data would fall on the straight line. The points, and the curved line fitted to them, represent the average responses of a large number of lay people. Thus, less frequently occurring risks are overestimated, and more frequently occurring risks are underestimated. As presented in "Judged Frequency of Lethal Events" (Lichtenstein et al., 1978).**

These causes of death tend to be the hazards that are often most over reported in the news. Similar findings were found with estimates of fatalities of various technological hazards (Slovic et al, 1979). Moreover, these samples have indicated that people often tend to think of themselves as immune to hazards. For example, they see themselves as better-than-average drivers, more likely than average to live past 80, less likely than average to be injured by tools they operate, and so forth

(Slovic et al., 1979; Slovic, 1987). Other studies have shown that individuals are roughly 1000 times more likely to accept "voluntary" risks in comparison to "involuntary" risks. Overall, their findings indicate that cognitive limitations coupled with anxiety causes uncertainties to be denied, risks to be distorted, and statements of fact to be believed with unwarranted confidence.

The significant contribution from the cognitive psychological literature is that it has provided explanations for judgmental biases. Moreover, the subjective, instinctive, facts-and-feelings nature of our perceptions has evolved into emotional cues and cognitive shortcuts. As a result, individuals rely on judgmental rules, or heuristics, to reduce the complexity of the issue to terms based on what they heard or observed. This allows individuals to quickly turn partial information into quick, easy to imagine choices.

These heuristics include: *availability,* which enables people to judge events as likely or frequent if instances of it are easy to imagine or recall; *overconfidence,* people's insensitivity to the validity of the assumptions to which their judgments are based; *desire for certainty*, people deny uncertainty in dealing with possible gains and losses, thus representing an additional source of certainty; *representiveness*, assessing the degree of similarity, rather than dissimilarity, between two objects; and *anchoring or adjustment*, a natural starting place or anchor

is used as a first approximation to the judgment (Tversky & Kahneman, 1981; Slovic, 1987).

Further studies in the cognitive psychological literature have examined decision problems, or choice amongst alternatives, that systematically violate the requirements of consistency and coherence (Tversky & Kahneman, 1981). This research found that as a result of the imperfection of human perception, changes of perspective often reverse the relative apparent size of objects and the relative desirability of options. For example, in this study the following question was asked to 152 students:

"Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the program are as follows:

If Program A is adopted, 200 people will be saved. (72%)

If Program B is adopted, there is a 1/3 probability that 600 people will be saved, and 2/3 probability that no one will be saved. (28%)

The majority of choice in this problem is risk adverse. Although the two programs will save the same amount of people, Program A is more attractive.

A second group of students (155 students) were asked a similar

question with a different formulation of the alternative programs:

If Program C is adopted 400 people will die. (22%)

If Program D is adopted there is 1/3 probability that nobody will die, and
2/3 probability that 600 people will die. (78%)

The majority choice in problem 2 is risk taking: the certain death of
400 people is less acceptable then the equal expected value of the 2/3
chance 600 will die. Thus, choices involving gains are often risk averse
and choices involving losses are often risk taking. Moreover, their findings
suggest that decisions are not focused upon final outcomes, but upon
incremental stages in a complex process. As such, what has gone before is
treated as a boundary behind which one ignores.

The practical application of this study's findings are presented in
"Informed Choice or Regulated Risk? Lessons from a Study in Radon
Communication" by Johnson et al. (1988). The authors tested the
assumption that information programs will motivate people to voluntarily
and rationally reduce risks associated with Radon.[1] They based this
assumption on the logic that individuals find consent more ethical when

---

[1]Radon causes more cancer deaths per year - 5,000 to 20,000 - than other pollutants under its jurisdiction. It is a colorless, odorless, gas that occurs naturally. It is relatively unfamiliar to individuals - both its origins and health risks - and unlike most environmental hazards, does not have an entity to blame. Due to the fact that most radon exposure occurs in people's homes, it led EPA to use risk communication strategies to reduce risk.

it is actual and explicit (e.g. individual decisions), rather than when it is

implicit or hypothetical (e.g. centralized decisions). However, the authors

argue that ethical issues cannot be avoided when content, format, and

tone of informative messages affect how people understand the

information (p.248). They found that differences in information

treatment do influence learning, formation of risk perceptions, and

intended and recommended behavior, as the previous experiment

suggested. For example, framing outcomes in particular ways to some

individuals may lead to an emotional response signifying loss. Likewise,

the framing of acts and outcomes can also reflect acceptance or rejection

of responsibility for particular consequences (p.256). Ultimately, their

findings indicated that different groups respond to the same message

differently.

Theories of risk perception from a cognitive psychological context

explain the caution individuals and risk communicators should take in

interpreting and presenting information. Moreover, the extent to which

individuals rely on heuristics in their decision-making process has

significant implications for risk communication. However, many of the

choices individuals are faced with are not conducted in research labs like

many of the cognitive psychological experiments previously mentioned.

Moreover, these findings cannot be attributed universally across

individuals or groups. In matters of risk perception, some researchers

argue that we act less as individuals, and more as social beings with

internalized pressures and delegated decision-making institutions (Douglas & Wildavsky, 1982). Therefore, our values and beliefs are not individual constructs, but deeply embedded collective mindsets about society and its functioning. Thus, we choose to live without knowing all of the risks that we face, following social rules about what to ignore.

Cultural Theory

According to Douglas and Wildavsky (1982), risk is best understood in terms of the plural social construction of the meaning attached to the risk, which they have defined as cultural theory. As such, competing cultures apply different meanings to situations, events, objects, and relationships. Therefore, individuals are embedded in a social structure which shapes their values, attitudes, and beliefs (Dake, 1991, 1992).

Cultural theory accounts for the social construction of risk in terms of three linked domains: *cultural biases*, shared values and beliefs that justify a way of behaving; *social relations*, a pattern of interpersonal relationships: hierarchical, individualist, egalitarian, fatalists, and autonomous; and *behavioral strategies* (Dake 1991,1992). Douglas and Wildavsky (1982) developed these interpersonal relationships using the two central dimensions of sociality: control and social commitment (Fig. 3). These relational forms, together with cultural biases, constitute what is or is not considered a risk. According to Dake (1991, 1992), these

social constructions of risk can be described in terms of "worldviews", which are general attitudes about the world and its social organization. Each worldview represents a different "rationality"; a set of pre-suppositions about the ideal nature of society which leads groups to perceive different risks and policy options (Wildavsky & Dake, 1990). Moreover, these worldviews serve as orientating dispositions which help individuals navigate through complex situations.

Four basic worldviews, based on interpersonal relationships, guide individual attitudes toward social relations: *hierarchists*, place a great deal of trust in expertise, dislike social deviance, and maintain the establishment of structure; they will accept risks as long as decisions about those risks are justified by experts; *individualists*, value individual achievement, support self-regulation, believe people should be rewarded materially for their achievements, and dislike rules that constrain individual initiative; they see risks as opportunities; *egalitarians*, are distrustful of institutions and their expertise, and see selfishness and greed as obstacles to a world in which wealth and power should be widely distributed; they oppose risks that will inflict danger upon many people or future generations and distrust the advice of a small group of experts; and *fatalists*, who see nature as unpredictable and uncontrollable, and favor isolation and resigned controls on their behavior; they try not to worry about things that they can do nothing about (Dake 1991, 1992).

Four Rationalities

Prescribed
(externally imposed restrictions on choice)

Grid
+

Nature capricious

THE FATALIST

It doesn't matter who you vote for.

Nature perverse/tolerant

THE HIERARCHIST

A place for everything.

Individualized   Collectivized

Group
+

−

Nature benign

THE INDIVIDUALIST

The bottom line.

Nature ephemeral

THE EGALITARIAN

Tread lightly on the earth.

−

Prescribing
(no externally imposed restrictions on choice)

Figure 3. **This chart demonstrates the group (control)/grid (social commitments) dimensionality to the four basic worldviews. Also, it explains the "myths of nature" each worldview follows. As presented in "Divided We Stand: Redefining Politics, Technology, and Social Choice" (Schwartz & Thompson, 1990).**

Through each of these separate worldviews, perceptions of risk are identified as a construct, or "rationality", of the socio-cultural context in which a decision is made. From a public policy perspective, understanding these patterns of belief is essential to how individuals perceive the social implications of the risk. For example, environmentalists may blame "the system" for environmental damage; corporations may call for market controls (e.g cap-and-trade); or bureaucratic organizations may call for top-down management (Thompson et al., 1990, as cited in Dake, 1992). According to cultural

theory, and in an attempt to explain how environmental risks are perceived, one must look at the social and cultural context of how that issue, or risk, is defined.

The cognitive psychological literature attempts to explain the complex nature of environmental risks, and the difficulty individuals have in making a "rational" assessment of the multiple dimensions they present. As such, researchers have established several cognitive shortcuts individuals take to turn complex information into the quick choices they make day by day. From a public policy perspective, both government and experts have attempted to mend this perception gap through access to education and information under the assumption that this will enable individuals to make better decisions. However, matters of who fears what and why are not universal among the public. In explaining who fears what and why, cultural theory explains how deeply held beliefs and values about social relations in groups greatly affect their risk perceptions. As such, researchers have stated that individuals act less as individuals and more as social beings. They have internalized social pressures and delegated decision-making processes to institutions, or any social structure or mechanism governing the behavior of a set of individuals (Douglas & Wildavsky, 1986; p.80). In contrast to the cognitive psychological literature which states that individuals are essentially isolated from social or cultural influences in their use of

simplifying mechanisms, cultural theory states that these institutions act as such mechanisms.

Regulatory Issues

Predicting risks requires predictions of events in a world where many potentially relevant, rapidly changing circumstances entail the expertise of many different individuals to reach a conclusion (Breyer, 1993). Therefore, government and experts are faced with the responsibility to bridge the assessment of risks as well as manage a political discourse around which risks are acceptable to society. As such, both researchers and professionals have found great difficulty in linking the social world - "demosphere" - of risk perceptions and the scientist's rational, ideal decision-making based in probabilistic thinking - "technosphere" (Plough & Krimsky, 1987). For many years, technical rationality assumed that experts can act independently of popular culture in structuring risk analysis, whereas cultural knowledge was assumed to adapt to the rationality of experts. However, regulating risks in a complex environment with an emotionally charged public continues to evolve with social, political, and economic changes.

Technical Rationality	Cultural Rationality
Trust in scientific methods, explanations; evidence appeals to authority and expertise	Trust in political cutlure and democratic process
Appeal to authority and expertise	Appeal to folk wisdom, perr groups, and traditions
Boundaries of analysis are narrow and reductionist	Boundaries of analysis are broad; include the use of analogy and historical precedent
Risks are depersonalized	Risks are personalized
Emphasis on statistical variation and probability	Emphasis on the impacts of risk on the family and community
Appeal to consistency and universiality	Focus on particularity; less concerned about consistency of approach
Where there is controversy in science, resolution follows status	Popular responses to scientific differences do not follow the prestige principle
Those impacts that cannot be uttered are irrelevant	Unanticipated or unarticulated risks are relevant

Figure 4. **This table lists the aspects of technical and cultural rationality in the risk regulating process. As presented in "The Emergence of Risk Communication Studies: Social and Political Context" (Plough & Krimsky, 1987; p.230).**

Most of the academic literature that examined the regulation of risk falls into three main categories: Risk management, risk assessment, and risk communication. In matters dealing with how the public perceives risk, risk communication has been the field that has bridged the technical and social aspects of risk. Moreover, it has had significant influence on how individuals formulate environmental attitudes, intentions and behavior. Therefore, examining the structural and psychological bases of environmental attitudes, intentions and behavior lends to how risk regulators can interact in a society that demands a voice in the social and political discourse of environmental risks.

As the technical component of the regulatory system, risk assessment is designed to measure the risk (hazard x exposure)

associated with the substance. There are four key parts to this process:

Identifying the potential hazard; drawing a dose response curve;

estimating the amount of human exposure; and categorizing the results

(Breyer, 1993). Research over the last several decades has found that

regulatory agencies allocate a great deal of resources to regulate even the

smallest of risks, largely due to the over-reaction of the public. In fact,

the reason U.S. Justice Stephen Breyer wrote his book, "Breaking the

Vicious Cycle: Toward Effective Risk Regulation," was due to the

disputes, uncertainties, and costs associated with the science

surrounding the risk. None the less, the technical aspect of risk

regulation is not free of politics. Once the risk is assessed, regulators

must decide what the assessment reveals, a process known as risk

management. Essentially, this becomes a balance between how the

regulation will diminish one risk, while at the same time produce

attention to different risks.

Therefore, the extent to which risk assessment and risk

management outcomes are relayed to the public is a matter of risk

communication. This aspect of risk regulation informs individuals about

the existence, nature, form, severity, or acceptability of risks (Breyer,

1993). Other definitions include, "an interactive process of exchange of

information and opinion among individuals, groups, and institutions"

(O'Leary et al., 1990; p.166). Risk communication grew out of the need

for risk managers to gain public acceptance for their policies guided by risk assessments.

Its origins can be traced to the height of the nuclear power industry, which, after risk assessments warranted it as a relatively safe technology, the lay public grew increasingly suspicious. Experts wanted to understand why the public did not see the nuclear industry through their "rational" eyes. Peters and Slovic (1996) found that perceptions of nuclear energy were largely determined by affect (positive or negative feelings about specific objects, ideas or images) and cognition. Thus, what for many experts was deemed "fact" was overshadowed by the "facts-as-feelings" nature of the public.

The success of risk communication must be measured to some degree by the extent to which popular attitudes reflect technical rationality, and the extent to which popular behavior conforms to technocratic values (Plough & Krimsky, 1987). Therefore, to mend the discrepancy between technical risk assessment and public perceptions, a cultural approach must be adapted that bridges expert and public approaches to a risk event. These approaches can be logical and coherent on their own terms, but may exhibit differences in how the problem is articulated with respect to the factors relevant to the analysis, and who the experts are (Fischhoff et al, 1981).

CHAPTER THREE: EMPERICAL METHODS

Data and Measures

Through understanding the social structural and social psychological bases of environmental concern, as well as how risks are perceived and communicated, the public often displays non-rational judgment. Moreover, this bias is influenced by the values and beliefs individuals attribute to the environment. To test the theoretical findings presented in the previous chapters, this analysis will use the 2010 General Social Survey (GSS) and re-assess the findings in Dietz et al. (1998) to further illustrate the bases of environmental concern and the policy implications of these findings.[2]

The 2010 General Social Survey (GSS) interviewed a random national sample of 2,044 respondents through the months of February, March and April of 2010. This data set was used due to its reliability, replicability, as well as representation of the U.S. population in 2010. Following the previous study by Dietz et al. (1998), this study excluded those groups with relatively small numbers. Individuals whose race was coded as "other" (184 respondents), or who reported religious denomination other than Protestant, Catholic, or no religion were excluded from the sample.

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[2]The Dietz et al. (1998) study tested the social structural and social psychological bases of environmental concern using data from the 1993 General Social Survey.

Based on the sample, the General Social Survey included 54 items in the 2010 environment module which were developed to measure variables that are connected to the theoretical constructs within the environmental attitude and behavior literature. These constructs include social structural as well as social psychological influences on environmental attitudes, intentions and behavior. Each of these constructs will be compared separately within tables to control for the predicative power of each. They will then be combined to examine the extent to which these associations are maintained. This will allow for the strength of each theoretical construct to be compared. Additionally, the effects of social psychological variables within social structural groups will show the extent to which environmental beliefs are relevant within social groups.

Items that will be measured include: behavioral indicators (behavioral intention and past behavior); attitudes, beliefs, and cognitions; general worldviews about humanity and the environment; and social-structural items. These items were linked following a principal component analysis to determine the dimensionality of each group. This method reduced the number of predictor variables to a smaller number of dimensions. After rotating the factors using a varimax rotation, the factors determined the structure of each group. Those items with a factor loading above .40 were used to create the appropriate scales. The scales that were constructed followed those used in the Dietz et al. (1998) study

and look to re-assess the extent to which these theoretical constructs are conceptually representative and maintained in the 2010 U.S. population.

Behavioral Indicators

Behavioral Indicators	Definition	Mean	S.D.	N
Willingness to Sacrifice (WTS)[1]	How willing are you to make personal sacrifices for environmental quality?	2.84	1.08	1302
Consumer Behavior (CB)[2]	How often do you use products or services which are environmentally friendly?	2.19	0.65	1252
Sign a Petition on Environmental Issue (SP)[3]	In the last five years, have you signed a petition on an environmental issue?	0.17	0.37	1381
Member of Environmental Group (GG)[3]	Are you a member of any group whose aim is to preserve or protect the environment?	0.06	0.23	1400
Environmental Spending (ES)[4]	Do you think we are spending too much, too little, or the right amount on improving and protecting the environment?	2.44	0.71	960
Protect the Environment (PE)[5]	Do you think government should have a role in deciding how people/business protect the environment?	0.75	0.35	984

[1]*Scale range from 1 (not willing at all) to 5 (very willing)*
[2]*Scale range from 1 (never) to 4 (always)*
[3]*Scale range from 0 (no) to 1 (yes)*
[4]*Scale range from 1 (too much) to 3 (too little)*
[5]*Scale range from 0 (government let people/business decide) to 1 (government should pass laws)*

The 2010 GSS environment module contained 13 questions focused on past behavior and intention. Two of the questions in this category were not included: if the respondent had participated in a demonstration about an environmental issue; and if the respondent had given money to an environmental group. The former was omitted based

on the analysis by Dietz et al. (1998) which questioned the validity of the item. The latter was omitted due to the low number of respondents (258). Based on the remaining 11 questions, factor analysis sorted the items into the following categories: willingness to sacrifice (WTS), consumer behavior (CB), and political/collective behavior (SP and GG).

Each of these items was recoded so that a positive score reflects a pro-environmental position. The collective or political behavior category had low alpha reliability (.420), so each item was analyzed separately. These items asked respondents whether they are a member of a green group (GG) and if they had signed a petition on an environmental issue (SP). The WTS and CB scales, as well as the alpha loadings, are provided in the appendix. Some respondents indicated within the CB items that they did not have access to certain products or services. These respondents were omitted from the scale along with those who responded "don't know."

Two additional items were analyzed on government environmental spending (ES) and role of government in environmental protection (PE). The item on ES was a split ballot experiment and only one ballot measure was analyzed, thus the lower sample size relative to the other items tested. This item asked respondents if government is spending too much, too little, or just the right amount on improving and protecting the environment. Additionally, the measure on role of government in

environmental protection (PE) provides further examination of respondent's political behavior. These two variables, one in regards to "business", the other "people", asked respondents, "If you had to choose, which one of the following would be closest to your views? Government should let (people/business) decide for themselves how to protect the environment, even if it means they don't always do the right thing, or government should pass laws to make (people/business) protect the environment, even if it interferes with (people/business) rights to make their own decisions." These two questions were combined to create a new item where a higher score represented a pro-law position. Not only does this question cover the balance between the state and the individual, but it provides further explanatory power beyond the environmental spending item. Lastly, all of the categories are separated between past behaviors (CB, GG and SP) and behavioral intentions (WTS, ES, and EP).

Attitudes, Beliefs, and Cognitions

Attitudes, Beliefs and Cognitions	Definition	Mean	S.D.	N
Awareness of Consequences (AOC)[1]	Do you believe these activities have negative consequences for the environment?	3.66	0.69	1216
Locus of Control (Internal) (LCI)[2]	It is just too difficult for someone like me to do something about the environment.	3.52	1.12	1362
Locus of Control (External) (LCE)[2]	There is no point in doing what I can for the environment unless others do the same.	3.43	1.13	1379
Know Solution (KS)[3]	How much do you feel you know about the solutions of environmental problems?	2.52	1.02	1357
Know Cause (KC)[3]	How much do you feel you know about the causes of environmental problems?	2.94	1.07	1359

[1]*Scale range from 1 (not dangerous at all for the environment) to 5 (very dangerous for the environment)*
[2]*Scale range from 1(strongly disagree) to 5 (strongly agree)*
[3]*Scale range from 1(know nothing at all) to 5 (know a great deal)*

The GSS consisted of 10 attitude, belief, and cognition items of which six were used in the factor analysis. These items created a six variable scale with an alpha reliability of .806 (see appendix). These questions looked at whether six kinds of environmental activities have negative consequences for the environment. The scale was recoded so that higher scoresrepresented belief in greater awareness of consequences (AOC). Beliefs about the consequences of such activities have been identified as strong predictors of environmental behavior. Studies including Schwartz's (1977) theory of moral norm activation as well as Dunlap & Van Liere's (1978) new ecological paradigm measured these items relative to environmental concern.

This block also included measures of internal (LCI) and external (LCE) locus of control. These items represent an individual's perception of whether he or she has the ability to bring changes through their own behavior. Individuals with a strong LCI believe that their actions can bring about change. People with a strong LCE feel that their actions are insignificant, and feel that change can only be brought about by others. LCI was measured based on the question "it is just too difficult for someone like me to do something about the environment." The response was based on a 5-point scale from "strongly agree" to "strongly disagree". LCE was measured based on the question "there is no point in doing what I can for the environment unless others do the same." The response was based on a 5-point scale from "strongly agree" to "strongly disagree" (see appendix). In both variables, a higher score represented a pro-environmental position, signifying that they have the ability to do something about the environment.

Also included was a measure of environmental knowledge and awareness. In the study by Hines et al. (1987), their meta-analysis of environmental behavior indicated knowledge of issues and knowledge of action strategies as primary indicators of environmental attitudes, intentions and behavior. Two aspects of knowledge were measured: how much the respondent knows about the cause of environmental problems (KC) and how much the respondent knows about solutions (KS) to

environmental problems.[3] To measure KC, the question was used, "how much do you feel you know about the causes of these sort of environmental problems? Answers were based on a 5-point scale, ranging from "know nothing at all" to "knowing a great deal." To measure KS, the questions asked, "how much do you feel you know about solutions to these sort of environmental problems?" Answers were based on a 5-point scale, ranging from "know nothing at all" to "knowing a great deal." Cause and solution were included separately since they each have a predictive ability towards behavior. For example, given high levels of knowledge about the causes of environmental problems, an individual may be more likely to strengthen their environmental behavior to offset possible risks, or conversely, individuals will decrease their environmental behavior if they are certain on the causes of environmental problems, thus realizing there is little they can do. Additionally, Kollmus and Agyeman (2002) state that an increase in environmental awareness leads to individuals being less likely to make bigger lifestyle sacrifices, but more willing to accept political changes that will enhance pro-environmental behavior. This logic follows with knowing solutions to environmental problems as well.[4]

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[3]These environmental problems include: air pollution, chemicals and pesticides, water shortage, water pollution, nuclear waste, domestic waste disposal, climate change, genetically modified food, and using up our natural resources.

[4]The correlations between KC and KS do not fully support this hypothesis. WTS (B=.227, B=.190, respectively) and CB (B=.242, B=.222, respectively) – both larger lifestyle sacrifices – show stronger positive correlations then GG (B=.113, B=.097,

General Worldview and Ideology about Humanity and the Environment

General Worldview and Ideology about Humanity and the Environment	Definition	Mean	S.D.	N
Progress versus the Environment (PB)[1]	Trade-offs between progress or economic growth and the environment.	2.95	1.19	1373
Fragility of Nature (FB)[1]	Human interaction with natural environment.	2.87	0.79	1328
Postmaterialism (PM)[2]	Value orientation towards self-expression and quality of life over economic and physical security.	1.52	0.99	1166

[1]*Scale range from 1 (strongly disagree) to 5 (strongly agree)*
[2]*Scale range from 0 (none of America's priorities should be postmaterialistic values) to 3 (America's highest priorities should be postmaterialistic values)*

The General Social Survey contained five items which were used to judge general ideas about the nature of human-environment relationships. Through factor analysis, two categories were created: whether economic progress is environmentally harmful (PB), whether human activity is harmful to the environment (FB) and post materialism (PM). The first category was "progress vs. environment" (PB) which had an alpha reliability of .621. Some studies found that belief in growth influences individuals to be less inclined to make personal sacrifices (Kollmus & Agyeman, 2002). The item was coded so that a higher score

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respectively), ES (B=.084, B=.074, respectively), and PE (B=.145, B=.099, respectively) – all of which are larger political changes that will enhance behavior. SP (B=.214, B=.205, respectively) is the only political change that is correlated to a similar strength as larger lifestyle and sacrifices.

represents a pro-environmental position. The other factor represented respondents view about human interaction with the environment. This was interpreted as representing "fragility of nature" (FB) beliefs. This factor had an alpha reliability of .516. This item was recoded so that higher scores represent a pro-environmental position. Both of these factors are theoretically linked to cultural theory (Douglas & Wildavsky, 1982; Dake, 1991, 1992). Scales and factor loadings for both of these categories are included in the appendix.

The first factor, "progress vs. environment" (PB), conforms to the individualist belief that market forces will overcome environmental consequences. Moreover, this item is indicative of the current discourse around environmental issues. The second factor, "fragility of nature" (FB), shares with the first key myths of nature identified in the cultural theory of risk. This position is common with egalitarians, representing high levels of concern about environmental risk, and also increased participation in environmental movement organizations (Dake, 1992).[5]

Another item that was measured and is also a measurement of ideology or worldview is post-materialism (PM). This item is established throughout the environmental behavior literature as a justification for environmental concern (Dunlap & Mertig, 1997). The question in the

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[5]The correlation between FB and AOC was a statistically significant moderate-positive relationship (B=.373). However, the correlation between FB and GG was a non statistically significant weak-negative relationship (B= -.015).

GSS asked respondents to choose "the one thing you think should be America's highest priority, the most important thing it should do. America should: (1) Maintain order in the nation; (2) give people more say in government decisions; (3) fight rising prices; (4) protect freedom of speech." Following this question, there was a second question that asked respondents to choose the second most important item from the same list. The second and the fourth item were both considered post-materialist values, while the first and the third are materialist. A scale was created by assigning two points if a post-materialist item was selected as a top priority and one point if it was given second priority, creating a scale 0-3. Therefore, a higher score yields stronger post-materialist values.

Social Structural Variables

The General Social Survey contained several variables to test the social structural influences of environmental attitudes, intentions and behavior. Variables including gender, race, age, income, and religion were recoded using dummy variables. In each item, the larger variable was used as the reference category. Gender was recoded as (1=Female) and race was recoded as (1=Black). Age was recoded to include three groups: Baby-boomers (between the ages of 45-65); Generation X (between the ages of 30-44); and Generation Y (<30 years old). Income

was recoded by using the median income of respondents ($50,000) as a midpoint (1=Below median income).

Also included were measures for education, political ideology, and party identification. Education was a linear measure of years of education (0-20). Political Ideology was measured using a 7-point scale from extremely liberal to extremely conservative. This variable was recoded so that higher scores represented a more liberal position. Due to the findings that suggest liberals are more likely to show higher levels of concern for the environment, and following the structure of Dietz et al. (1998), this item was renamed liberalism. Party identification was used to assess which political party the respondent identified with. Three dummy variables were created: (1=Democrat); (1= Republican); and (1=Independent).

Variables for religion, religious strength, and spirituality were also used. Religion was recoded into dummy variables for the three most prominent denominations: (1=Protestant); (1=Catholic); and (1=No Religion). A measure of religious strength was also included based on the question "would you call yourself a strong....or not a very strong...?" The variable was recoded so that those that responded "strong" were coded 3, those responding "somewhat strong" were recoded 2, and those responding "not very strong" were recoded as 1. Individuals with no religious affiliation were recoded as 0. A measure of spirituality was also

measured using the question, "to what extent do you consider yourself a spiritual person?" The question consisted of a 4-point scale from "very spiritual" to "not spiritual at all." This item was recoded so that higher scores represent a more spiritual person.

Statistical Procedures

Ordered logistic regression (OLR) and bivariate logistic regression (BLR) was used to determine the predictive ability of the independent variables on the dependent variable. Both look to predict the change in the dependent variable for a unit change in the independent variable. OLR allows for the relative importance - logit regression coefficient - of the independent variable to be identified. BLR uses odds-ratios since the variable is dichotomous.

Other than SP and GG, all variables were tested using OLR. SP and GG were tested using BLR. For this analysis, there was not a need for standardized estimates since only statistical effects across columns were analyzed.

Also, the analysis consists of examining the coefficient of multiple determinations (Cox and Snell pseudo R^2 for OLR and BLR). Similar to the R^2 in OLS regression, this attempts to measure the percentage of total variation in the dependent variables that is explained by the variation in all the independent variables. This study follows the

understanding that environmental data is often skewed, as well as the

fact that Dietz et al. (1998) did not find substantial differences in the

results when outliers were deleted.[6] Additionally, sample sizes for each of

the variables and indexes vary due to the recoding techniques.

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[6]Individuals who are surveyed one-on-one have a tendency to exaggerate their environmental attitudes and behavior to conform to norm expectations.

CHAPTER FOUR: DATA ANALYSIS

Table 1
The Effect of Social Structural Variables on Behavior and Intention

	Willingness to Sacrifice (WTS)	Consumer Behavior (CB)	Sign Petition (SP)	Member of Group (GG)	Environmental Spending (ES)	Protecting the Environment (PE)
Gender						
Male	0.00	0.00	0.00	0.00	0.00	0.00
Female	-0.03	0.17*	0.55**	0.72	0.04	0.03
Race						
Black	-0.20*	-0.25*	0.53*	0.35	-0.34*	-0.09
White	0.00	0.00	0.00	0.00	0.00	0.00
Age						
Baby Boomers	0.00	0.00	0.00	0.00	0.00	0.00
Generation X	0.00	-0.17*	0.63*	1.11	0.08	-0.16
Generation Y	0.07	-0.22*	1.10	0.78	0.17	-0.30*
Income						
Above Median Income	0.00	0.00	0.00	0.00	0.00	0.00
Below Median Income	-0.01	0.10	0.57**	0.38*	-0.01	0.04
Education	0.05**	0.04**	1.16**	1.11	0.02	0.06**
Liberalism	0.07*	0.10*	1.32**	1.55**	0.07	0.07
Party Identification						
Democrat	0.06	0.04	1.19	0.97	0.10	0.13*
Independent	0.00	0.00	0.00	0.00	0.00	0.00
Republican	-0.12**	-0.03	1.05	1.13	-0.16*	-0.10
Religion						
Protestant	0.00	0.00	0.00	0.00	0.00	0.00
Catholic	0.05	0.26**	1.31	0.80	-0.05	0.13
No Religion	0.34	0.21	1.15	0.32	0.02	0.20
Religious Strength	-0.01	0.03	0.84	0.62	-0.06	0.05
Spiritual Person	0.08	0.12**	1.39**	1.50*	0.05	-0.05
R²	.10	.09	.10	.04	.07	.09
N	835	817	868	879	599	633

Note: WTS, CB, ES and PE are interpreted as unstandardized logit regression coefficients. SP and GG are

interpreted as odds-ratios.

*p<.10, **p<.05

In Table 1, the pseudo R^2 of each dependent variable indicates that there remains significant explanatory power for behavioral intentions beyond the social structural variables.[7] The findings from this table highlight the following insights into the effect of social structural variables on behavior and intention:

- Education and Liberalism tend to be the strongest predictors of environmental behavior and intentions.

- Religion and Religious strength is a weak predictor of environmental behavior and intention. However, an individual's level of spirituality is a stronger predictor of past behavioral items.

This set of variables explains (pseudo R^2) between 4% and 10% of the variation in behavior and intention. Gender is related to CB and SP, with females more likely than males to engage in CB, but less likely than males to SP. Race shows a statistical effect on WTS, CB, SP and ES with blacks being less likely than whites to engage in each of these behavior and intentions.

Age cohort shows a statistical effect on CB, SP and PE. Generation X (30-44) and Generation Y (< 30 years old) respondents are less likely to engage in CB than Baby Boomers (45-65). Generation X (30-44)

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[7]This is also due to the fact that anytime the dependent variable is a range of integers, R^2 statistics are relatively low.

respondents are less likely than Baby Boomers (45-65) to SP; and Generation Y (< 30 years old) respondents are less likely to believe government should pass laws for individuals and businesses to protect the environment (PE).

Income shows a statistical effect on SP and GG - both public behaviors. Below median income individuals are less likely than above median income individuals to engage in these past behaviors. It would seem that income would show a statistical effect on WTS and/or CB items. However, being that income is associated with political and/or collective groups implies further insight into the context in which these organizations target the public.

Both education and liberalism are two of the strongest predictors among behavior and intentions. The more educated the respondent, the more likely they are to show a positive statistical effect on WTS, CB, SP and PE. The more liberal the respondent, the more likely they are to show a positive statistical effect on WTS, CB, SP and GG.

Religion in this block only shows a statistical effect on CB, with Catholics more likely to engage in this behavior than Protestants. Religious strength does not show a statistically significant effect on any of the behavior or intention items mentioned.[8] The item which measured

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[8]Religion and Religious Strength have a high correlation among Protestant (B=.512) and No Religion (B=-.864). Due to the high correlation, this may weaken the statistical

spirituality shows a positive statistical effect on CB, SP and GG. Lastly, party identification shows a positive statistical effect on WTS, ES and PE, with Republicans less likely than Independents to engage in WTS and ES. Democrats are found more likely than Independents to believe government should pass laws for businesses and individuals to protect the environment (PE).[9]

Table 2
The Effect of Social Psychological Variables on Behavior and Intention

	Willingness to Sacrifice (WTS)	Consumer Behavior (CB)	Sign Petition (SP)	Member of Group (GG)	Environmental Spending (ES)	Protecting the Environment (PE)
Postmaterialism (PM)	-0.01	-0.01	1.28**	1.23	-0.06	-0.19**
Awareness of Consequences (AOC)	0.40**	0.50**	1.39**	1.16	0.55**	0.30**
Progress Beliefs (PB)	0.24**	0.04	1.32**	1.32*	0.32**	0.27**
Fragility Beliefs (FB)	0.19**	0.00	0.82	0.95	0.04	0.10
Locus of Control (Internal) (LCI)	0.06	0.06	1.33**	1.20	0.10	0.12*
Locus of Control (External) (LCE)	0.07*	0.05	1.14	1.10	-0.06	0.04
Know Cause (KC)	0.11**	0.09*	1.37**	1.08	0.00	0.06
Know Solution (KS)	0.07	0.13**	1.20	1.28	0.05	0.08
R^2	.24	.17	.11	.03	.20	.18
N	950	906	969	981	507	746

Note: WTS, CB, ES and PE are interpreted as unstandardized logit regression coefficients. SP and GG are interpreted as odds-ratios.

*p<.10, **p<.05

significance of these variables. Additionally, the variance inflation factor (VIF) indicated that No Religion and Religious Strength may pose multicollineartiy (Tolerance of .197 and .201, respectively). As such, removing religious sects from the analysis would show that religious strength is statistically significant, and vice-versa.

[9]Party Identification and Political Ideology have a high correlation among Democrats (B=.426) and Republicans (B=-.465). Due to the high correlation, this may weaken the statistical significance of these variables. However, the variance inflation factor (VIF) indicated that multicollineraity is not a problem.

In Table 2, the pseudo R^2 is significantly higher than Table 1, indicating the influence of social psychological variables on behavior and intention. The social psychological items tend to predict more in regards to behavioral intention (WTS, ES and PE) than in past behavior (CB, SP and GG). The findings from the table highlight the following insights:

- Both AOC and PB are strong predictors of behavior and intention.

This set of variables accounts for 3%-24% of the variance in behavioral indicators. PM shows a statistical effect on SP and PE, with respondents indicating PM values more likely to SP, but less likely to believe government should pass laws to protect the environment (PE). AOC shows a positive statistical effect on WTS, CB, SP, ES and PE. PB shows a positive statistical effect on WTS, SP, GG, ES and PE. FB shows a positive statistical effect on WTS. LCI shows a positive statistical effect on SP and PE. LCE shows a positive statistical effect on WTS.[10] KC shows a positive statistical effect on WTS, CB, and SP. KS only shows a positive statistical effect on CB.[11]

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[10]LCI and LCE have a high correlation (B=.472). Due to this high correlation, this may weaken the statistical significance of these variables. However, the variance inflation factor (VIF) indicated that multicollinearity is not a problem.

[11]Know cause of environmental issues (KC) and know solution of environmental issues (KS) have a high degree of correlation (B=.631). Due to this high correlation this may weaken the statistical significance of these variables. However, the variance inflation factor (VIF) indicated that multicollinearity is not a problem.

Table 3
The Effect of Social Structural and Social Psychological Variables on Behavior and Intention

	Willingness to Sacrifice (WTS)	Consumer Behavior (CB)	Sign Petition (SP)	Member of Group (GG)	Environmental Spending (ES)	Protect the Environment (PE)
Gender						
Male	0.00	0.00	0.00	0.00	0.00	0.00
Female	-0.05	0.18*	0.55*	0.90	0.11	-0.09
Race						
Black	-0.07	-0.05	1.09	0.71	0.11	0.13
White	0.00	0.00	0.00	0.00	0.00	0.00
Age						
Baby Boomers	0.00	0.00	0.00	0.00	0.00	0.00
Generation X	-0.02	-0.26**	0.74	1.31	-0.04	-0.17
Generation Y	0.13	-0.20	1.57	1.09	0.24	-0.24
Income						
Above Median	0.00	0.00	0.00	0.00	0.00	0.00
Below Median	-0.04	0.09	0.75	0.46	-0.03	0.18
Education	0.04*	0.03	1.11*	1.05	-0.05	0.03
Liberalism	0.01	0.03	1.28*	1.46*	0.08	0.10
Religion						
Protestant	0.00	0.00	0.00	0.00	0.00	0.00
Catholic	-0.05	0.21*	1.47	0.94	-0.07	0.15
No Religion	0.19	0.14	0.71	0.23	0.76*	-0.08
Religious Strength	-0.01	0.08	0.75	0.58	0.17	0.06
Party Identification						
Democrat	0.04	-0.01	1.07	0.80	-0.09	0.02
Independent	0.00	0.00	0.00	0.00	0.00	0.00
Republican	-0.10	-0.02	1.06	0.95	-0.20*	-0.10
Postmaterialism (PM)	0.00	-0.02	1.31*	1.13	-0.04	-0.23**
Awareness of Consequences (AOC)	0.45**	0.49**	1.55*	1.17	0.47**	0.20
Progress Beliefs (PB)	0.24**	0.02	1.15	1.19	0.34**	0.25**
Fragility Beliefs (FB)	0.21**	0.06	0.90	1.29	-0.06	0.07
Locus of Control (Internal) (LCI)	0.03	0.11**	1.47**	1.51	0.12	0.20**
Locus of Control (External) (LCE)	0.11*	0.02	1.15	1.09	-0.09	0.07
Know Cause (KC)	0.14*	0.12*	1.12	1.15	0.13	0.09
Know Solution (KS)	0.02	0.11	1.39*	1.17	-0.09	0.07
R²	.31	.21	.17	.06	.24	.23
N	636	618	646	654	323	491

Note: WTS, CB, ES and PE are interpreted as unstandardized logit regression coefficients. SP and GG are interpreted as odds-ratios.

*p<.10,** p<.05

In Table 3, controlling for both the social structural and social psychological variables adds a significant amount of predictive strength to the behavior and intention items. However, these two groups explain behavioral intention more so than past behavior. Some interesting highlights from this table include:

- Social psychological variables are stronger predictors of behavior and intention.

These variables explain between 6%-31% of the variance in behavior indicators. Social psychological variables added an additional 2%-19% of variance to the social structural items for behavioral indicators. Race in this table is not predictive of any items regarding behavior and intention. Gender only shows a positive statistical effect on SP, in which females are less likely than males to engage in this behavior. Age only shows a positive statistical effect on CB in which Generation X (30-44) respondents are less likely than Baby Boomers (45-65) to engage in environmental behaviors. Income does not show any statistical effect on the behavioral indicators. Education shows a positive statistical effect on WTS and SP. Liberalism shows a positive statistical effect on SP and GG. Religion shows a positive statistical effect on CB and ES. Catholics are found more likely than Protestants to engage in CB, while those who

identified with No Religion are more likely than Protestants to believe we are not spending enough on the environment (ES). Religious strength and spiritual person do not show any statistical effect on the behavioral indicators. Party identification only shows a statistical effect on ES, in which Republicans are less likely than Independents to think the government is spending not enough money on the environment (ES). PM shows a positive statistical effect on SP and PE, with respondents indicating they are PM more likely to SP, but less likely to believe government should pass laws for people and business to protect the environment (PE). AOC shows a positive statistical effect on all behavior and intentions except GG. PB shows a positive statistical effect on WTS, ES and PE. FB only shows a positive statistical effect on WTS. LCI shows a statistical effect on CB, SP and PE. LCE only shows a positive statistical effect on WTS. KC shows a positive statistical effect on WTS and CB. KS only shows a positive statistical effect on SP.

Table 4
The Effect of Social Structural and Postmaterialism on Environmental Beliefs

	Awareness of Consequences (AOC)	Fragility Beliefs (FB)	Progress Beliefs (PB)	Locus of Control (Internal) (LCI)	Locus of Control (External) (LCE)	Know Cause (KC)	Know Solution (KS)
Religious Strength	-0.14	-0.06	-0.14	0.01	-0.03	0.06	-0.10
Spiritual Person	0.27**	0.05	-0.06	0.25**	0.20*	0.13	0.15
Religion							
Protestant	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Catholic	0.16	0.38*	0.29	-0.21	-0.10	-0.08	0.22
No Religion	0.12	0.64	0.02	0.34	0.02	0.35	0.19
Race							
Black	0.19	0.82**	-0.94**	-0.76**	-0.46*	-0.68**	-0.27
White	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gender							
Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female	0.38**	-0.04	0.18	0.25	0.11	-0.77**	-0.43**
Age							
Baby Boomers	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generation X	-0.02	0.14	0.25	0.02	0.00	0.17	0.29
Generation Y	-0.21	0.09	0.07	0.13	0.02	0.11	0.28
Income							
Above Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Below Median	0.38**	0.40**	-0.18	-0.45**	-0.02	-0.24	0.02
Education	-0.08**	-0.09**	0.15**	0.19**	0.14**	0.13**	0.13**
Liberalism	0.21**	0.16**	0.20**	0.06	-0.01	0.13	0.07
Party Identification							
Democrat	0.30**	0.00	0.18*	0.05	-0.02	0.22**	0.08
Independent	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Republican	-0.14	-0.01	-0.08	0.03	0.00	0.20*	0.19*
Postmaterialism (PM)	-0.10	-0.07	0.14*	0.16*	0.14*	0.17*	0.15*
R²	.19	.12	.17	.16	.08	.14	.09
N	682	730	747	745	751	743	745

Note: AOC, FB, PB, LCI, LCE, KC and KS are interpreted as unstandardized logit regression coefficients.

*p<.10,** p<.05

In Table 4, environmental beliefs are used as the dependent variable to determine their predictive ability given social structural items and postmaterialism (PM). Some highlights from this table include the following:

- Education tends to be the most statistically significant predictor of environmental beliefs

- Age is a poor predictor of environmental beliefs.

Social structural items and postmaterialism account for between 8%-19% of the variance in environmental beliefs. In this table, religious strength does not show any statistical effect on environmental beliefs. Religion only shows a statistical effect on FB, with Catholics more likely to hold FB than Protestants. This may contribute to the finding that Catholics are more likely than Protestants to engage in CB. Religious strength does not show a statistical effect on any of the environmental beliefs. However, those respondents indicating they are a spiritual person are associated with three of the environmental beliefs: AOC, LCI and LCE. Race is astrong predictor of environmental beliefs, although the results are not consistent. Blacks are more likely than whites to hold FB, however, they are less likely than whites to show a positive statistical association with PB, LCI or KC. Gender also does not tell a complete story, with females more likely than males to hold a high AOC, yet less likely to hold KC or KS. However, this follows the findings in the past literature that on average women tend to be more concerned about the environment, yet know less about the causes and solutions to environmental issues. Age cohort turns out to be a poor predictor of environmental beliefs, showing no statistical effects. Income shows a

statistical effect on three of the environmental beliefs. Below median income individuals are more likely than higher income individuals to have an increased AOC and FB, yet are less likely to display LCI. Further insight to this finding could be due to the workplace environment or living environment of individuals. Education is one of the strongest predictors of environmental beliefs. Higher levels of education shows a positive statistical effect on PB, LCI, LCE, KC and KS. However, higher levels of education show a negative statistical effect on AOC and FB. Liberalism shows a positive statistical effect on AOC, FB and PB. Party identification is predictive of several environmental beliefs. Democrats are more likely to display a higher AOC, PB and KC. However, Republicans are more likely to hold KC and KS. Lastly, PM shows a statistical effect on PB, LCI, LCE, KC and KS.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

My analysis both supports and refutes the previous research. Examining the change in the pseudo R^2 indicates the significant influence of social psychological variables on behavior and intention. Moreover, social psychological variables add the most additional variance to WTS (21%) and the least variance to GG (2%). The median increase in predicative ability was 10%, which is identical to the findings by Dietz et al. (1998). For four out of the six equations, adding the social psychological power more than doubled predictive power, and tripled

predictive power for two behavioral intention items (WTS and ES). This indicates the influence of social psychological variables on environmental behavioral intentions.

Overall, many of the findings are similar to those found in the Dietz et al. (1998) study in which the social structural variables are *not* operating through the social psychological variables.[12] This is due to the social structural patterns remaining the same, although losing a significant amount of predictive power. However, several of the social psychological variables - LCI, LCE and KS - gain predictive ability through the inclusion of social structural variables. In Table 3, LCI gains predictive ability in CB and PE, and LCE gains predictive ability in WTS. KS gains predictive ability in SP.

Gender and race are found to be weak predictors of environmental behavior and intention, with the only statistical effect found among females who are less likely than males to SP. This differs from the Dietz et al. (1998) study which found that gender and race maintained several statistical effects. Females were less likely than males to have a positive statistical effect on WTS, yet were more likely than males in CB. Race was found to be predictive of both CB and ES, with blacks more likely than whites to engage in these behavior and intentions.

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[12] However, in Table 3, No Religion does gains a statistical effect on ES.

Likewise, both studies found that females tend to have a higher AOC in comparison to males, while the Dietz et al. (1998) study also found a statistical effect with females having higher FB. Additionally, this study also controlled for KC and KS in which females were less likely than males to hold these beliefs. For policy decision makers, this fact shows that methods of education and information should be directed at women, while males, for example, are more likely to be influenced through affect and imagery.

In this study blacks were found more likely than whites to hold FB, yet were less likely than whites to feel that human progress was harming the environment (PB). These findings followed the results from the Dietz et al. (1998) study. However, this study additionally found blacks less likely than whites to feel they can do anything about the environment (LCI); more likely than whites to feel that everyone must play their role to do something about the environment (LCE), and less likely than whites to KC. For policy decision makers, empowering blacks to realize the power of their decisions to affect the environment, and increasing knowledge of environmental causes is important to influencing future behavior and intention. Moreover, the finding that blacks are less likely than whites to view human progress as more important than the environment supports the hypothesis that while on a whole blacks may be more concerned about the environment, there are many other issues that compete for their resources.

Age only showed a statistically significant effect on CB in which individuals age 30-44 (Generation X), were less likely than those age 45-65 (Baby Boomers). Dietz et al. (1998) found similar patterns with CB, and additionally that those < 34 were less likely than those between ages 35-47 to SP and more likely to believe the government should be spending more money to protect the environment (PE). Additionally, they found that those individuals > 47 believe the government should be spending less on the environment (ES) than those age 35-47.

Age did not show any statistical effect on any of the social psychological variables in this study, yet Dietz et al. (1998) found two statistical effects. Those aged 47 and older were less likely than those age 35-47 to have a high AOC, and were less likely to view the environment over human progress (PB). Moreover, the lack of statistical effects on age and behavior and intention as well as environmental beliefs, suggests that age has become less significant in determining environmental beliefs. However, the behavior and intentions which are most age specific continue to be CB.

Income, which was not controlled for in the Dietz et al. (1998) study, show no statistical effect on any of the behavior and intention variables. However, income was a strong predictor of environmental beliefs. Those individuals below the median income were more likely that those above median income to have a high AOC; more likely to hold FB;

yet, less likely to feel that there is anything they can do about the environment (LCI). These statistical effects indicate that what while below income individuals have stronger environmental beliefs, they lack the feeling of knowing there is something they can do to help the environment. Similar to the findings with race, in which blacks showed a higher concern for the environment, but lack of feeling there is anything they can do, policy decision-makers should direct strategies which focus on the underlying values and beliefs that orientate individuals toward increased LCI.

Education shows a positive statistical effect on WTS and SP, in which the more educated are more willing to engage in these behavior and intentions. Dietz et al. (1998) found education to show a statistical effect on WTS, SP, and GG. Likewise, in this study education was found to be one of the strongest predictors of environmental beliefs. The more educated were more likely to view the environment over human progress (PB); more likely to have a strong internal (LCI) and external locus of control (LCE); and more likely to KC and KS. However, education showed a negative statistical effect on AOC and FB. These results share some consistency with the Dietz et al. (1998) study which found that education showed a negative statistical effect on FB.

This proves that education is a far better predictor of environmental beliefs than it is of environmental behaviors and

intention. Moreover, the consistency between studies that more years of education equates to more concern about the environment is muddled by the negative statistical effects on AOC and FB.

Liberalism only showed a statistical effect SP and GG – both political behaviors. In Dietz et al (1998), liberalism was significantly more predictive of behavior and intentions, in which the more liberal showed positive statistical effects on all behavior and intention items. Thus, the decrease in these statistical effects shows the decline in political ideology in determining behavioral intentions and most past behaviors. In both this study and Dietz et al. (1998), liberalism was a strong predictor of environmental beliefs. Likewise, liberalism showed a positive statistical effect on AOC, FB and PB. In Dietz et al. (1998), a similar pattern was found with liberalism showing a positive statistical effect on AOC and PB.

Religion was a poor predictor of environmental behavior and intentions as well as environmental beliefs. The only statistical effect was that Catholics were more likely than Protestants to engage in CB. Likewise, it was found that Catholics hold FB higher in comparison to Protestants. Similarly, the Dietz et al. (1998) study found Catholics more likely to engage in CB and more likely to SP then Fundamentalists. Additionally, their study found Catholics, moderate and liberal

Protestants, and those with no religion to be more likely than

Fundamentalists to hold PB.[13]

Lastly, PM shows a statistical effect on SP and PE, where those

who identified with PM values were more likely to SP and more likely to

believe people/business should decide for themselves how to protect the

environment (PE). In Dietz et al. (1998), PM shows a statistical effect on

WTS, CB and SP where those who identified with PM values were more

likely to engage in these behavior and intentions.

PM was also a strong predictor of environmental beliefs in this

study. Those who identified with PM values were more likely to hold a

LCI, LCE, KC and KS. Dietz et al. (1998) found that those who identified

as PM were less likely to hold FB, but not PB.

Conclusion

The analysis presented in this thesis provides new insights into the

literature on environmentalism as well as on perceptions of risk and

communication strategy. This study indicates that when determining

what influences environmental behavior and intentions as well as

environmental beliefs, social psychological variables remain the strongest

predictors. As such, this conclusion is supported by the findings of Dietz

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[13] In the Dietz et al. (1998) study, religious sect was analyzed through the following categories: Fundamentalist, Moderate Protestant, Liberal Protestant, Catholic and No Affiliation.

et al. (1998), and further suggests that many of the social-structural effects that existed in their study are overshadowed by the social psychological variables.

None the less, this study finds supports the conclusions in Dietz et al. (1998), which suggests data sets of this size should include more measures of attitude, belief and worldview variables. These include the worldview orienting dispositions measured in cultural theory; moral norm activation; risk perception; and affect and imagery. Research from Lesierowitz (2006), Peters & Slovic (1996), and Dake (1991,1992) have included appropriate scales examining perceptions of risk and affect and imagery. These scales will provide more accuracy and context in how social psychological variables operate, thus influencing behavior.

Additionally, the significance that social psychological factors play in a person's attitudes, intentions and behavior towards the environment leads back to the psychological and cultural underpinnings of risk perception. This analysis provides context into the values and beliefs that guide individual concern for the environment and the subsequent behaviors and intentions with which they correspond.

As it was previously mentioned, some experts have argued that the public should be removed from the risk regulating process entirely. However, regulating risks requires the cooperation of a collective body of

lay people. Likewise, as cultural theory has established, people tend to evaluate risks as members of a community. The research on risks described in this essay has had an overwhelming tendency to avoid the experimental context of risk - that is, actual people considering real threats to their well-being or other peoples' well being. Laboratory experiments of cognitive psychologists represent risk perception within the bounded rationality of experts. As a result, these models reveal more about the cognitive context of the research rather than about how a person constructs and experiences risk in a social context (Dake, 1992). Understanding how the public views risks requires understanding the social context of the values and beliefs they place on these issues. Therefore, the public must be a part of the risk regulation process, and as such, organizations and professionals must engage in more effective and efficient risk communication strategies acknowledging these cognitive and cultural perceptions.

Therefore, the risk communication process must not focus only the content of the message, but also the overall process of how risks are communicated to the public. As O'Leary et al. (1990) state in their chapter on risk communication in "Managing the Environment: Understanding the Legal, Organizational and Policy Challenges," there are four elements of the risk communication process that managers need to understand: the source of the message; the design of the message; the delivery channel; and the target recipients.

While government agencies and industry are the common sources of risk communication messages, many other groups, including environmental advocates, communication groups, and the media play important roles. Now, these sources are even more prominent in the age of technology, where information is more available to anyone who seeks it. Therefore, each of these groups represents a different dimensionality to the complexity of the risk decision-making process. Moreover, it underscores the necessity of approaching risk problems through a platform that is sustainable and adaptable to the complexities that these issues present. As the public perceives each of these channels of risk communication differently, it is important that public organizations continue to build public trust, specifically through transparency. This involves understanding how their own values and beliefs align with the public as well as understanding the cognitive rationality of the public they look to inform. As such, these organizations must cooperate in defining how the message is formulated.

Experts must balance how to take highly technical, quantitative analysis and put it in terms that are understood by the lay public. The findings of this analysis suggest that understanding individual behavior and intention as well as environmental beliefs is largely based on social psychological characteristics. Essentially, the design of the message becomes a process of understanding the cognitive psychological literature that explains how individuals filter complex information to

make quick decisions, but also the cultural rationality that exists in the community where the risk is to be communicated and the values and beliefs that enable citizens to see their side of the problem. To know how to solve social problems, it becomes essential to understand the society in which you look to influence.

As such, the delivery channel of the information must take into account the social, political, and economic context in which the risk information is conveyed. This has several implications: how are individuals likely to perceive the source of the message? Who are the leaders within the community that influence public opinion? Which institutions are most likely to have credibility in communicating these risks? Which media sources does the community rely on? This involves the ability tounderstand the many different dimensions that influence how the public perceives environmental risk as well as understanding through what means that message can be conveyed.

Therefore, the objective of risk communication must be two-ways. Risk communication is not about enabling the public to see rationality through the expert's view, but a deeper understanding of the values and preferences of the community. Moreover, this is also a call to individuals to continue to challenge what they perceive, value and believe and continue to question their assumptions. Therefore, risk communication is a participatory process. Viewing the public as partners in the risk

communication process will enhance public participation in the political and social discourse in how to effectively make decisions about collective risk.

Additionally, Congress and the laws and policies which it enacts must require legislation, rules and regulations to be consistent with the reality of environmental protection in an imperfect world. A set of rules crafted to fit one set of socio-ecological conditions can erode as social, economic and technological developments increase the potential for human damage to the ecosystems and even the biosphere itself. Thus, successful commons governance requires that rules evolve (Dietz et al., 2003). Policy decision-making must not confine itself to any one-size-fits-all approach. The process should be a continued effort to evolve around the complexity of the public mindset.

Therefore, the way to cope with such massive problems continues to follow the edict: think globally, but act locally. Global thinking in present terms may raise some of the central questions of risk management: how to reconcile technological systems with social values; how to develop the consensus about potentially dangerous technologies that is necessary for potential growth; and how to establish and maintain trust in our protective institutions. Moreover, it guides our idea about the way we want to live in this society. Therefore, the continued most effective way for our society to learn how to cope with risk is to enable

locally based risk management endeavors. This will inevitably change how the public must balance risks against the local economic impact of controlling them, and involve the local public in a meaningful way in the decision-making process. Most importantly, it will develop trust through an increase in social capital, which occurs when communities maintain frequent communication and dense social networks (Dietz et al., 2003). This process involves acknowledging our own individual beliefs and values, while being cognizant of how we perceive the risks we face and seeking to understand others.

Understanding who fears what and why, and how to influence behavioral change and intention is a process that involves a continued understanding in not only human cognition, but also in the deeply embedded values we share as social beings. This empirical analysis sought to further develop how our values and beliefs about the environment shape our behavior and intentions, and to what extent these values and beliefs differ within social groups. The findings that it presents further underscore the conclusion of Dietz et al. (1998) that our attitudes, intentions and behavior operate primarily through social psychological constructs. Moreover, comparing the results from these studies, which expand over 17 years, indicate the influence that social psychological variables have taken over common social structural groupings. Additionally, this may suggest the divergence of common

social structural groups into more dynamic, complex groupings. Our tendency as individuals to process certain information and disregard other, and to find great difficulty in balancing our subjective process of reason and gut reaction, facts and feelings, has lead to our society producing fears in light of the facts. Effective risk regulation requires all sectors of society and the public to not only become more aware of the biases we face as individuals, but develop collective solutions to mutually defined risks. Understanding the environmental risks our society faces will continue to be a difficult question to answer given the difficulty in understanding the individual balance of emotion and cognition as well as the deeply imbedded social values and beliefs which orientate our decisions. Answers to complex policy issues such as managing environmental risks should not seek to be right or wrong, but instead should center on trade-offs around what we value as individuals and as groups. While perfect decisions are not the goal, we can continue to strive to better understand the values we share collectively, and in the process better understand ourselves and others.

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APPENDIX I.

SOCIAL-PSYCHOLOGICAL VARIABLES

	Mean	S.D.	Alpha if item deleted	Alpha	N
Awareness of Consequences Index	3.66	0.69		0.81	1216
In general, do you think that a rise in the world's temperature caused by climate change is...	3.44	1.14	0.71		1304
In general, do you think that air pollution caused by cars is...	3.53	0.89	0.79		1362
In general, do you think that nuclear power stations are...	3.40	1.13	0.57		1311
In general, do you think that air pollution caused by industry is...	3.89	0.85	0.84		1369
In general, do you think that pesticides and chemicals used in farming are...	3.65	0.90	0.72		1354
In general, do you think that pollution of America's rivers, lakes, and streams is...	3.96	0.88	0.71		1368
Scale range from 1 (not dangerous at all for the environment) to 5 (extremely dangerous for the environment)					

	Mean	S.D.	Alpha if item deleted	Alpha	N
Progress versus the Environment Index	2.95	1.19		0.62	1373
People worry too much about human progress harming the environment.	3.04	1.05	0.85		1349
We worry too much about the future of the environment and not enough about prices and jobs today.	2.95	1.19	0.85		1373
Scale range from 1 (strongly agree) to 5 (strongly disagree)					

	Mean	S.D.	Alpha if item deleted	Alpha	N
Fragility of Nature Index	2.87	0.79		0.52	1328
Almost everything we do in modern life harms the environment.	3.23	1.03	0.83		1360
Economic growth always harms the environment.	2.52	0.88	0.81		1341
Scale range from 1 (strongly disagree) to 5 (strongly agree)					

	Mean	S.D.	N
Postmaterialism			
What do you think should be America's highest priority, the most important thing it should do? Second most important thing it should do?	1.52	0.999	1166
Scale range from 0 (none of America's priorities should be postmaterialistic values) to 3 (America's highest priorities should be postmaterialistic values)			

	Mean	S.D.	N
Locus of Control (Internal)			
It is just too difficult for someone like me to do much about the environment.	3.25	1.21	1362
Scale range from 1 (strongly disagree) to 5 (strongly agree)			

	Mean	S.D.	N
Locus of Control (External)			
There is no point in doing what I can for the environment unless others do the same.	3.43	1.13	1379
Scale range from 1 (strongly disagree) to 5 (strongly agree)			

	Mean	S.D.	N
Know Solution			
How much do you feel you know about the solutions to environmental problems?	2.52	1.02	1357
Scale range from 1 (know nothing at all) to 5 (know a great deal)			

	Mean	S.D.	N
Know Cause			
How much do you feel you know about the causes of environmental problems?	2.94	1.07	1359
Scale range from 1 (know nothing at all) to 5 (know a great deal)			

APPENDIX II.

BEHAVIORAL INDICATORS

	Mean	S.D.	Alpha if item deleted	Alpha	N
Consumer Behavior Index	2.19	0.65		0.77	1252
How often do you make a special effort to sort glass or cans or plastic or papers for recycling?	2.90	1.08	0.53		1373
How often do you make a special effort to buy fruits or vegetables grown without pesticides or chemicals?	2.15	0.98	0.66		1364
How often do you cut back on driving for environmental reasons?	1.80	0.87	0.72		1303
How often do you reduce the energy or fuel you use at home for environmental reasons?	2.28	0.98	0.74		1395
How often do you choose to save or re-use water for environmental reasons?	1.90	0.96	0.66		1397
How often do you avoid buying certain products for environmental reasons?	2.10	0.91	0.73		1385

Scale range from 1 (never) to 4 (always)

	Mean	S.D.	Alpha if item deleted	Alpha	N
Willingness to Sacrifice Index	2.84	1.08		0.84	1302
How willing would you be to much higher prices in order to protect the environment?	3.08	1.22	0.86		1343
How willing would you be to pay much higher taxes in order to protect the environment?	2.68	1.28	0.88		1350
How willing would you be to accept cuts in your standard of living in order to protect the environment?	2.73	1.26	0.81		1354

Scale range from 1 (not at all willing) to 5 (very willing)

	Mean	S.D.	N
Sign Petition			
In the last five years, have you signed a petition about an environmental issue?	0.17	0.37	1381

Scale range from 0 (no) to 1 (yes)

	Mean	S.D.	N
Member of Group			
Are you a member of any group whose aim is to preserve or protect the environment?	0.06	0.23	1400

Scale range from 0 (no) to 1 (yes)

	Mean	S.D.	N
Protect the Environment			
Government should let (people/business) decide for themselves how to protect the environment, even if it means they don't always do the right thing, or governemnt should pass laws to make (people/business) protect the environment, even if it interferes with (people/business) right to make their own decisions?	0.75	0.35	984

Scale range from 0 (government should let (people/business) decide) to 1 (government should pass laws)

	Mean	S.D.	N
Environmental Spending			
Do you think we are spending too little, too much, or about the right amount on improving or protecting the environment?	2.45	0.71	976

Scale range from 1 (too much) to 3 (too little)

APPENDIX III.

SOCIAL STRUCTURAL VARIABLES

	Mean	S.D.	N
Gender			
Male	0.44	0.50	2014
Female	0.56	0.50	2014

	Mean	S.D.	N
Race			
Black	0.17	0.37	1861
White	0.83	0.37	1861

	Mean	S.D.	N
Education	13.45	3.14	2009
Scale range from 0-20 years			

	Mean	S.D.	N
Age			
Baby Boomers (45-65)	0.45	0.50	1651
Generation X (30-44)	0.33	0.47	1651
Generation Y (< 30)	0.22	0.42	1651

	Mean	S.D.	N
Income			
Above Median Income	0.51	0.50	2014
Below Median Income	0.49	0.50	2014
Median income recorded was $50,000			

	Mean	S.D.	N
Religion & Spirituality			
Protestant	0.54	0.50	1818
Catholic	0.27	0.44	1818
No Religion	0.2	0.40	1818
Religious Strength[1]	1.92	1.08	1933
Spiritual Person[2]	2.14	0.96	1933

[1]Scale range from 1 (somewhat strong) to 3 (strong)

[2]Scale range from 1 (not spiritual at all) to 4 (very spiritual)

	Mean	S.D.	N
Party Identification			
Republican[1]	0.66	1.03	1979
Independent	0.18	0.39	1979
Democrat[1]	1.01	1.18	1979

[1]Scale range from 1 (Independent, close to (Democrat/Republican)) to 3 (strong (Democrat/Republican))

	Mean	S.D.	N
Political Ideology			
Liberalism	3.92	1.46	1944
Scale range from 1 (very conservative) to 7 (extremly liberal)			