

THE ROLE OF SOCIAL PARADIGM IN HUMAN PERCEPTION
AND RESPONSE TO ENVIRONMENTAL CHANGE

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By

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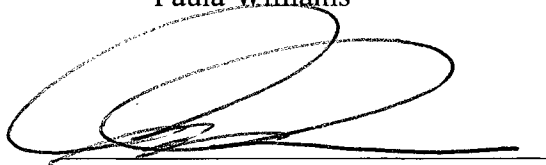
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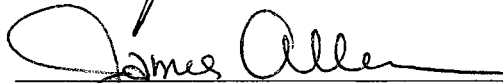
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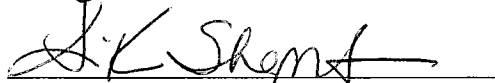
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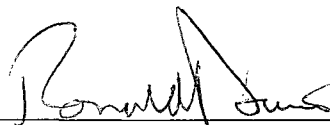


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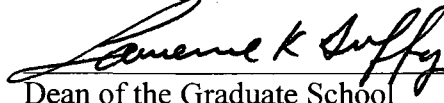


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ABSTRACT

The role of social paradigms in resilience to change is poorly understood. Past research suggests that social paradigms shape human values through socialization, including those for our environment and alter an individual's attentiveness to information. Thus, there is a relationship among personal cognition, the objective environment, social paradigm, and human behavior, which I posit may affect perception of and response to change, hence human adaptive capacity.

The western industrialized dominant social paradigm (WISP) is a set of assumptions, concepts, values, and practices that influence our relationship to the environment. It includes beliefs in continuous economic growth; limited governmental intervention in free market systems; and faith that technology will resolve environmental problems. Past research indicates that the WISP correlates negatively with environmental concern and with belief in the need to change behaviors.

In this work, measures for environmental values, the WISP, and environmental behaviors were developed from the General Social Survey and analyzed using mediation. The relationship between WISP, environmental concern and environmental behaviors was tested. Regression analysis suggested that WISP reduces environmental concern, thereby reducing environmental behaviors.

The spatial relationship between built environment and environmental values and built environment and the WISP was also investigated. The results suggest that geographic regions with less built environment are significantly more environmentally concerned and have higher values of the WISP. Medium-sized cities exhibited

significantly lower values of the WISP.

Finally, extensive and diverse literature was reviewed to compare other paradigms affecting the relationship between humans and the biophysical environment. Other paradigms foster links between humans and their environment and also serve the purpose of incorporating ritual, myth and story-telling to conform human behavior to the limits of the biophysical environment rather than conforming the biophysical environment to human desires.

Accurate perception of environmental feedback and appropriate responses to change increase resilience. This work suggests that the currently predominant social paradigm may reduce our resilience by impairing our perception of change and our willingness to adapt.

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List of Acronyms

AC – Awareness of consequences

AR – Ascription of responsibility

CAS – Complex adaptive system

CO₂ – Carbon dioxide

DSP – Dominant social paradigm

ERB – Environmentally responsible behaviors

GSS – General Social Survey

HEP – Human exceptionalist paradigm

HIPPO - Habitat loss, invasive species, pollution, population growth, and over consumption

NEETF – National Environmental Education Training Foundation

NEP – New environmental paradigm later re-named the new ecological paradigm

NSRE – National Survey on Recreation and the Environment

SES – Socio-ecological system

TPB – Theory of planned behavior

WISP – Western industrial social paradigm

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THE ROLE OF SOCIAL PARADIGM IN HUMAN PERCEPTION AND RESPONSE TO ENVIRONMENTAL CHANGE

Chapter 1 INTRODUCTION

At both global and national scales, we are facing rapid environmental change, including rising global temperatures (Jones, Parker, Osborn, & Briffa, 2006), increasing extraction costs of non-renewable resources (Livernois & Uhler, 1987), significant transformation of habitats resulting in loss of biodiversity (Forester & Machlis, 1996; Hoekstra, Boucher, Ricketts, & Roberts, 2005) and threats to water sources both in terms of scarcity (Millenium Ecosystem Assessment, 2003; Walker & Salt, 2006) and in terms of pollutants (EPA, 2001; 2001; Millenium Ecosystem Assessment, 2003). Research supports the claim that human behaviors are the primary drivers of rapid environmental change in two ways. First, consumer purchases drive both the use of resources, which are extracted from the environment, and the radical transformation of habitat for use by humans. (Soule, 1991; World Resources Institute, 1992). Second, waste generated from the manufacturing process, and from packaging and used products, are discarded into the environment (Platt & Seldman, 2000). Yet, we do not fully understand how, or to what extent, individuals perceive feedback from the environment and, if they do, whether they are willing to make changes, either to mitigate damage or to adapt to a changing environment. This lack of understanding of human perception and willingness to adapt has profound implications for resilience of humans as a species. If humans insist on continuing behaviors that science indicates has a high probability of being maladaptive, in other words if we refuse to adapt, this creates a significant vulnerability and reduces

our resilience as a species. An understanding of the factors that impact the willingness and ability of humans to perceive and respond to changes in the environment is essential.

1.1 The Relationship Between Human Behaviors and the Environment

1.1.1 *Environmental Concern and Values*

National opinion polls administered by Gallup and other polling organizations have predominated research on general American values of and concerns about the environment. Both pollsters and academic researchers have surveyed Americans about their specific understanding of global climate change and environmental concerns, including: water and air pollution, toxic waste, damage to the ozone layer, loss of tropical forests, extinction of plants and animals, acid rain, urban sprawl, and loss of open space (Gallup, 2005, 2006; Hoff & Polack, 1993; Hunter & Brehm, 2003; Leiserowitz, 2004; NEETF/Roper, 2005; among others).

The responses from these surveys suggest that a large majority of Americans highly value the environment and believe that humans are negatively impacting it. One national survey of 2,995 Euro-Americans, 248 African-Americans, 169 U.S.-born Latinos, 44 foreign-born Latinos and 57 Asians found that (84.3%) of respondents highly value the environment and believe that humans are negatively impacting it (NSRE, 2000). Some (about 40%) believe that the overall quality of the environment in the United States is "excellent" or "good" but about one half (48%) rated it "only fair," while roughly 10% called it "poor" (Gallup, 2005). Almost 72% of Americans believe we are about to experience a major environmental catastrophe (Cordell, Betz, & Green, 2002) but what that is, remains unspecified. Thirty-five percent of Americans say they worry a

great deal about the quality of the environment; 30% worry a fair amount; and 34% express little to no worry (Gallup, 2005).

1.1.2 *Environmental Knowledge*

Despite expressing high levels of value of and concern about the environment, studies clearly show that Americans, as a group, do not fully understand either the causes or the consequences of environmental problems (Stamm, Clark, & Eblacas, 2000) or how their daily activities contribute to those problems. In a study conducted by Bord, O'Connor and Fisher (2000) 1,218 American adults returned questionnaires that asked them to list various major or primary causes of global climate change. Respondents listed the following causes: pollution/emissions from business and industry (70%), destruction of tropical forests (66%), depletion of ozone in the upper atmosphere (65%), people driving their cars (50%), use of coal and oil by utilities or electric companies (46%), use of chemicals to destroy insect pests (28%), use of aerosol spray cans (25%), nuclear power generation (21%) and only 13% thought that people heating and cooling their homes had an impact on global climate change.

These responses reflect some of the significant misconceptions held in the public domain about environmental behaviors. Many Americans incorrectly relate depletion of the ozone layer with global climate change as evidenced above by responses that use of aerosol spray cans (which formerly contained chloroflourocarbons, an ozone-depleting chemical¹) and depletion of the ozone layer contribute to global climate change. Two other examples of incorrect information include the belief that nuclear power plants

¹ Chloroflourocarbons (CFCs) were banned in aerosol cans 1987 with the signing of the Montreal Protocol.

contribute to climate change, and the low percentage (13%) of people who recognize that heating and cooling homes significantly contribute to global climate change.

Global climate change is not the only area of the environment in which Americans have a poor understanding of causes or consequences. Hunter and Brehm (2003) reported that respondents in Utah revealed low levels of knowledge regarding the definition of biodiversity, forces leading to biodiversity loss (with the exception of local population and development pressures), or the implications of biodiversity loss. Similar confusion was found in studies exploring respondents' understanding of the details of natural ecological processes including native and endangered species, fire ecology, forest resources and ecosystem management (Jacobson & Marynowski, 1997) and the processes involved in materials recycling (Ebreo, Hershey, & Vining, 1999; Gamba & Oskamp, 1994). In a study conducted by the National Environmental Education Training Foundation (NEETF) in conjunction with Roper, their report concluded: "Americans have low levels of knowledge on basic environmental facts, underlying science, causes of certain conditions, and important public environmental issues. After three decades of school-based environmental education programs, only one-third of American adults can pass a simple test of environmental knowledge with a grade equivalent to A, B, or C. . . . understanding of causal connection is the single biggest problem in the environmental knowledge gap." (NEETF/Roper, 2005, p. 3).

1.1.3 *Environmental Behaviors*

The low level of knowledge about the environment is paralleled by the comparatively low level of environmental behaviors engaged in by most Americans. In

2000, for the first time since 1993, total and per capita waste in the United States increased (Platt & Seldman, 2000). Although Americans made up only 5% of the world's population in 2005, Americans consumed 68% of the world's energy (Energy Information Administration, 2005). Because Americans eat a diet heavy in beef and other animal products, U.S. per capita grain consumption is four times higher than that of developing countries (Brown & Kane, 1994).

The feedback of our behaviors to the environment has resulted in serious consequences. Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber and fuel. This has resulted in substantial gains in economic development and increased human life spans, but these gains have been achieved at growing costs in the form of the degradation of many ecosystems (Millennium Ecosystem Assessment, 2003). Smit and Wandel (2006) suggested that humans may be increasing the resilience of their social systems at the expense of the biophysical system.

As a means of categorizing the general areas in which major environmental degradation is occurring, the acronym HIPPO has been coined (Wilson, 2002). The words to which the acronym refers are: habitat loss, invasive species, pollution, population growth, and over consumption. As examples of habitat loss caused by human interactions with the environment, it is estimated that from 1990 to 2000, 1.33 million square kilometers of forest were lost (World Bank, 1999). Every day, an estimated nine square miles of U.S. rural land is lost to development (Durning, 1992). The estimated

50,000 invasive plant, insect and animal species in the United States, which are transported by humans to geographic regions to which they are not indigenous cause major environmental damage. Remediation of that damage and attempts to eradicate these species are estimated to cost approximately \$137 billion a year in the United States, and these species are the cause of many indigenous species being placed on the threatened or endangered species lists (Pimentel, Lach, Zuniga, & Morrison, 2000).

As one example of pollution, CO₂ emissions in 2004 in the United States were 5987.98 million metric tonnes (one metric tonne = 1,000 kilograms) (Energy Information Administration, 2005). One group of researchers estimated that adoption of readily available technologies to reduce fossil fuel emissions in Santiago, Chili; Sao Paolo, Brazil; Mexico City, Mexico and New York City, USA would reduce premature deaths in those cities by 64,000 people; chronic bronchitis cases by 65,000; and eliminate 46 million person-days of work loss (Cifuentes, Borja-Aburto, Gouveia, Turnston, & Davis, 2001). The world's population is growing by an estimated 76 million people per year. In 1975, world population was estimated to be 4.074 billion people, it was estimated to increase to 6.465 billion people by 2005 (United Nations, 2005).

In the United States, total yearly consumption per household increased from \$34,819 in 1997 to \$46,409 in 2005. Inflation over that period of time increased at an average yearly rate of 2.1% and consumer expenditures increased an average 3.5% per year (USDOL, 1997-2005). Thus, consumption in the United States has exceeded inflation. Increased consumption leads to increased environmental degradation as discussed above, loss of forests and other habitats from use of wood to make products, or

to clear areas for farms or fields for grazing cattle or for development, and increased CO₂ emissions caused by use of fossil fuels to manufacture products and transport them, not to mention increased use of other renewable and non-renewable resources as raw materials in the manufacturing process.

It would be easy to conclude that lack of environmental knowledge leads to lack of environmental behaviors. However, studies suggest that high levels of environmental knowledge are not correlated with increased environmental behaviors (see, e.g., Dieckmann & Preisendorfer, 1998; Dietz, Stern & Guagnano, 1998; Hunter & Rinner, 2004; Jacobson & Marynowski, 1997; Kollmuss & Agyeman, 2002), although knowledge of appropriate action to take to mitigate damage is important (Kollmuss & Agyeman, 2002; Stern, 1992). So, one must conclude that factors other than lack of environmental knowledge influence environmentally responsible behaviors (ERB) in the United States.

1.2 Theories Explaining Environmentally Responsible Behaviors

There are a wide variety of theories in many disciplines that may be used to understand human-environment interactions. A brief description of some of the most compelling follows.

1.2.1 *Resilience*

One theory that has the capacity to integrate and incorporate the concepts of all the other theories below is resilience theory. Resilience theory originated in ecological research in the 1970s, when Holling proposed that the dominant theory of one equilibrium state for an ecosystem may not be accurate (Folke, 2006). Resilience theory

applies to complex adaptive systems (CASs). Although there are 4 types of complex systems, social-ecological systems (SEs), in which humans and their environment interact, are predominantly type IV CASs (Gallopín, 2006; Lansing, 2003). Type IV CASs have the following characteristics: Components of a system tend to form patterns and hierarchies without outside influence, which is called self-organization (Folke, 2006). Emergence is the tendency of patterns of hierarchical organization to emerge from the components of the system. This can also refer to emergence of patterns or outcomes that were not expected, which results in surprise (Adger, 2006; Folke, 2006; Walker & Salt, 2006). The social and ecological systems are linked across different temporal and spatial scales, generally, the smaller scales tend to be faster and the larger scales tend to be slower (Folke, 2006). As an example, the carbon cycle of the geophysical system operates on a temporal scale in the range of centuries or longer with a global spatial scale, while the social system of burning hydrocarbons and emitting CO₂ happens each day, accumulates much faster than the biophysical system has the ability to absorb, and can be viewed on a spatial scale ranging from households up to global. Despite differences in both temporal and spatial scales, these systems are linked.

Complex adaptive systems change primarily in response to chance events and the local rules of interaction change as the system evolves and develops, which leads to nonlinear relationships among the components (Levin, 1998; Walker & Salt, 2006). Social ecological systems also have multiple states or domains, which are preferred positions for the system (Lansing, 2003). These states or domains have thresholds that, if crossed, will cause the system to move to another state (Gallopín, 2006; Gunderson &

Holling, 2002; Walker & Salt, 2006). The systems tend to move through adaptive cycles among periods of growth, conservation, release and reorganization (Gunderson & Holling, 2002; Walker & Salt, 2006).

Resilience theory has predominantly been used to study either social systems or biophysical systems in isolation. However, researchers are beginning to understand the linkages between these two systems and, increasingly, coupled social-ecological, or socio-ecological, systems are being studied (Gunderson & Holling, 2002; Walker & Salt, 2006). Social-ecological systems have powerful reciprocal feedbacks (Folke, 2006). In social-ecological systems, resilience is interpreted as: 1) the amount of disturbance a system can absorb and still remain within the same state or domain of attraction; 2) the degree to which the system is capable of self-organization (versus lack of organization or organization forced by external factors); and 3) the degree to which the system can build and increase the capacity for learning and adaptation. Resilience is “about the opportunities that disturbance opens up in terms of recombination of evolved structures and processes, renewal of the system and emergence of new trajectories. In this sense, resilience provides adaptive capacity . . .” (Folke, 2006, p. 259). One aspect of social systems that differ from ecological systems is the ability to anticipate and plan for disturbance. Thus, social systems may be capable of responding to disturbance in such a manner that its impact is minimized, or even used to advantage (Smit & Wandel, 2006). In order to be able to plan, adapt, and use disturbances to advantage, social systems (humans) must accurately perceive feedback or disturbance so that effective plans can be made.

The following theories examine the interconnection between humans and the biophysical environment primarily with a focus on one component of the human system or the biophysical system, rather than on the systems as a whole and interactions among systems. The theories that focus on human values, attitudes and behaviors toward the environment are social-psychological theories.

1.2.2 Social Psychological Theories

A review of the literature indicates that the two primary social-psychological models that have been used to understand and predict environmental behaviors are: the theory of planned behavior (Ajzen, 1991) and value-belief-norm theory (Stern & Dietz, 1994; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Stern, 2000).

1.2.2.1 The Theory of Planned Behavior

The theory of planned behavior and value-belief-norm theory have held somewhat conflicting views of how personal behaviors are motivated. Ajzen's (1991) theory of planned behavior (TPB) arose from the theory of reasoned behavior developed by Ajzen and Fishbein (1980). These theories are based on expectancy-value theory which attempts to explain how people form attitudes and when those attitudes are translated to behaviors. According to geographers, "The concept of attitude is important because it brings together the internal mental life of a person (i.e., cognitions, motivations and emotions) and overt behavioral responses within one framework (Gold, 1980:23)" (Golledge & Stimson, 1997, p. 201).

The TPB suggests that people form attitudes in ways that are self-serving; they engage in a cost-benefit analysis when making decisions about how they will behave.

According to the theory, attitudes are influenced by three factors: (1) the belief that change in behavior will result in benefits to the individual. (2) The value placed on the potential benefit, and (3) expectancy, which is an overall assessment of the benefits the individual may receive and how much he or she values those benefits. If both benefits and values of the benefit are high, the person will have a positive attitude toward the behavior. Given a positive attitude, the TPB model posits that subjective norms, defined as pressure by important others to either perform or not perform the behavior; and perceived behavioral control, defined as a person's belief in her or his ability to carry out the behavior, also influence whether the behavior will actually occur (Ajzen, 1991; Bamberg & Schmidt, 2003).

Ajzen and Fishbein (1980) have used this model to assess and predict a wide range of behaviors, and it has been used to predict ERB as well. Research by Ajzen (1991) suggests that his model may better predict certain behaviors by including motivators based on values and activation of personal norms, which are included in value-belief-norm theory.

1.2.2.2 *Value-Belief-Norm Theory*

Value-belief-norm theory is an outgrowth of the norm-activation model developed by Schwartz (1967; 1977) originating from his research on the mechanisms by which altruistic behaviors are motivated. His model, which he named the norm-activation model, posited that altruistic behaviors are motivated, and can be predicted, from the activation of personal norms. His model has predicted altruistic and moral behaviors well (Fellner & Schwartz, 1971). Empirical studies of environmental values

indicate that they are closely and positively correlated with altruistic values (Clump, Ramanaiah, & Sharpe, 2002; Hunecke, Blobaum, Matthies, & Hoyer, 2001). Value-belief-norm theory is an outgrowth of the norm-activation model and it focuses on factors that activate personal norms.

The factors considered to be important in this model are: (1) values, defined as “criteria for guiding action [and] for developing and maintaining attitudes toward relevant objects and situations” (Stern & Dietz, 1994, p. 67); (2) awareness of consequences (AC), defined as the belief that a situation may have negative consequences for something of value; and (3) ascription of responsibility (AR), the person’s belief that she or he has responsibility for causing, or ability to take action, to mitigate a problem (Stern & Dietz, 1994; Stern et al., 1999; Stern, 2000). Stern and Deitz (1994) suggested that most humans use a very abbreviated version of a value-expectancy calculation because even the most motivated person is not capable of considering all possible benefits, outcomes and values. Instead, they suggest that people use rule-based methods to simplify the process of estimating utility, and that values form the basis of many of these rules.

In applying norm activation concepts to ERB, Stern and colleagues (Stern, 2000; Stern et al., 1999) narrowed the values dimensions developed by Schwartz to those values that previous research had suggested were significantly correlated to ERB: altruistic, egoistic and traditional values. Their model, however, continues to emphasize the roles of AR and AC in motivating ERB (Stern, 2000; Stern et al., 1999). Research has suggested that including cost-benefit analysis factors such as those used in the theory

of planned behavior in a value-belief-norm model of behavior increases its predictive power (Follows & Jobber, 2000; Stern, 2000).

The increase in predictive power of these two models by including variables from the other may, at least partially, be explained by research which suggests that those who do not intrinsically value the environment engage in a cost-benefit analysis of environmental behaviors, therefore, the theory of planned behavior predicts these behaviors better; value-belief-norm theory predicts better for those who intrinsically value the environment (Fransson & Garling, 1999). It would seem intuitive to combine the two models, including those factors from each that reach statistical significance in predicting ERB. However, it is my contention that, in addition to combining the two models, another construct is important in predicting ERB. That construct is social paradigm. By a social paradigm I mean the set of concepts, values, and assumptions that constitute a way of viewing reality for a group of people (Kilbourne, 1995). Stern and Deitz (1994) have acknowledged the important contribution of social factors in influencing what is and is not valued by individuals. Social paradigm might be conceptualized as the overarching subjective norm of a group of people or society, one of the components of the model used in the Theory of Planned Behavior.

1.2.3 *Social Paradigm*

In discussions of ERB in the United States two assumptions are commonly made. The most prevalent of the two assumptions is that the economy will be harmed by environmental laws and by environmentally responsible behavior (Boyle, 1994; Milbrath, 1995). The second assumption is that we will not need to change our behavior because

technological advances will allow us to maintain our current lifestyles (Milbrath, 1995; Sterling, 2005). It is my contention that these assumptions arise out of our social paradigm, which has been labeled the 'dominant social paradigm' (DSP) by Kilbourne (1995). It is also my contention that the above assumptions arise because of messages generated within our society that we accept without question; and that these messages interfere with our willingness and ability to perceive, and act upon, feedback we receive from, and information we get about, the environment.

Kilbourne and colleagues (Kilbourne, 1995, 2006; Kilbourne, Beckmann, & Thelen, 2002) have traced the theoretical development of the western industrial DSP from the 1500s to the 1700s during The Enlightenment, when these ideas began to gain wide acceptance. The ideas leading to the dominant social paradigm include anthropocentrism, deconstructionism, and reductionism. Bacon and Descartes were instrumental in transforming the predominant view of nature from organic and spiritual to that of a mechanical world. Based on their ideas, religious and moral constraints were removed from the manipulation of nature (Kilbourne, 1995). Man was viewed for the first time as separate from nature; nature was to be dominated and mastered for the needs of humans (Kilbourne, 1995). This view became dominant during The Enlightenment and can be attributed to Bacon's success (Kilbourne, 1995). Domination of nature was brought about through the development of technology (Kilbourne, 1995). At about the same time, Locke and Smith transformed the view of society and its function in the political and economic arenas to free the individual to accumulate wealth. Consumption has now become the only end of economic progress (Kilbourne, 1995).

Kilbourne (2006), taking the definition from Milbrath, states that the DSP “consist[s] of . . . the values, metaphysical beliefs, institutions, habits, etc. that collectively provide social lenses through which individuals and groups interpret their social world” (p. 41). Kilbourne (2006) has constructed the DSP around the assumptions and beliefs arising out of The Enlightenment, as discussed above, that address our relationship to nature and the environment. The DSP comprises three dominant factors: (1) economic which is defined as atomistic individualism, limited government control and the accumulation of property; (2) technology which is defined as domination over nature; and (3) political which is defined as possessive individualism (individuals are in possession of themselves and are separate from society, from which the concept of private property arises), private property and limited government (the role of government is solely the protection of private property and possessions, and enforcement of contracts).

These ideas define our beliefs about our relationship to nature and the environment, and it seems intuitive that they would affect our environmental values, attitudes, and behaviors. There is empirical evidence to support this suggestion as well. Increased endorsement of the DSP is significantly correlated with lower levels of environmental concern as well as lower levels of self-reported willingness to engage in environmentally responsible behaviors (Kilbourne, et al., 2002; Nash & Lewis, 2006). In very general terms, the DSP measures faith in technology overall, and specifically as a solution to environmental problems; belief in the value of growth of the economy; and protection of the right to consume and to own private property.

The media transmits messages about environmental impacts humans are causing on an almost daily basis, particularly those relating to global warming. Yet, despite this information, we also receive messages that we are in a recession because consumers have failed to sufficiently consume, resulting in insufficient growth of the economy. On May 1, 2008 on National Public Radio, in a discussion with host Steve Inskeep about the growing number of people unable to pay their car loan, Philip Reed, a consumer advisor for Edmunds.com stated: "We are ... encouraged to buy vehicles, to finance vehicles, to get more car than we need as kind of a patriotic move to keep the economy going." The "toxic assets" that are widely blamed for the current financial crisis were created largely because people were encouraged to purchase homes whose mortgages they could hope to pay off only if housing prices continued to rise. The links between our level of consumption, growth of the economy and the environmental impacts of growing consumption are rarely made and we receive conflicting messages. Supporting the contention that conflicting messages regarding the environment may affect our environmental behaviors, a study by Jurin and Fortner (2002) compared students who expressed higher levels of environmental concern to those who did not, and found that those expressing higher levels of concern did not exhibit higher levels of environmental behaviors. They suggested that environmental values are merely "symbolic."

It is unlikely that the DSP is universally embraced by all people, particularly because of the number of dimensions Kilbourne includes in it. Even in the United States, which scores highest on DSP values, it is likely that individuals will have a slightly differing view of the different dimensions of the DSP and how they interrelate. It may be

that the values of the DSP, overall, somewhat resemble a Bell curve with most people holding values of the DSP in the mid-range and fewer others having extreme values on one end or the other. I propose that, due to this heterogeneity in the range of values associated with balancing control of versus dependence on nature, it is better to reference this as the western industrial social paradigm (WISP). On the assumption that this is not a world-wide predominant paradigm, I will refer to these concepts as the WISP except when specifically referring to Kilbourne and colleagues' research.

Based on the foregoing research, it is likely that the WISP plays a dual role in environmentally responsible behaviors: it is instrumental in values formation (Stern, Dietz, Kalof, & Guagnano, 1995); and through the values that are formed, in influencing knowledge and information that people are willing to attend to and act upon (Thorgersen & Grunert-Beckmann, 1997).

Hypothesis 1: The dominant social paradigm will reduce environmental concern when WISP is strong, or increase environmental concern when WISP is weak. The western industrial social paradigm impacts environmental behaviors by affecting our concern for the environment.

1.3 The Spatial Relationship Between the WISP and Environmental Concern

Geography is uniquely suited to explain human-environment interaction, as this is the focus of the discipline. Geographers have criticized social-psychological theories of attitude-behavior or value-behavior links on the basis that they do not account for interactions between the person and the physical environment (Desbarats, 1983). Citing Ittelson, Garling and Golledge (1989) stated that perception of the environment is

complex, and the quality of the complexity also differs. There are many reasons for this, including: 1) The environment provides information perceived by multiple sensory channels. 2) Environments are unbounded and surround the person, and extend over long time spans and integration of inputs. 3) Both central and peripheral information are present in environments, “the information is more than can possibly be processed; and the information may simultaneously be redundant, inadequate and ambiguous. Thus information in environments needs to be selectively attended to, and the relevance of the information needs to be judged” (Garling & Golledge, 1989, p. 205). 4) Environments are perceived holistically. 5) Perception is directed at purposeful action (Garling & Golledge, 1989).

Two geographic theories of person-environment interaction are transactional and transformational theories. Aitken (1992) distinguished transactional theory as concerned with contexts of person-environment interdependence, and transformational theory as concerned with person-environment change. From a pragmatic perspective, the focus of transactional theory “revolves around understanding how person-in-environment contexts may be transformed as a function of ongoing transactions between people and their environments. The transactional whole provides a context for study comprised of inseparable, reticulate, interdependent factors.” (Aitken, 1992, p. 557). Transformation theory provides an alternative framework for understanding the dynamic of environmental change when that change exceeds day to day change, and looks at what factors influence the relative stability or instability of people’s relationship with the physical and social environment (Aitken, 1992).

Other researchers have suggested a research agenda for behavioral geography based upon the perspective of a dynamic environment/behavior system as the unit of analysis (Aitken & Bjorklund, 1988). “The individual does not control the environment, but rather behaviorally controlled feedback enables the person/environment system to use and re-use, structure and re-structure, earlier acquired information, and to attach new information towards adapting and changing behavior.” (Aitken & Bjorklund, 1988, p. 59). Fraser and colleagues (Fraser, Mabee, & Slaymaker, 2003) stated that the struggle to find compromises between environmental integrity and human needs emphasizes three complexities: 1) the nature of environmental response may be unforeseen and may take years to be felt. 2) The population affected by the environmental problem may not be the same population that caused the problem. 3) Different communities will have different abilities to adapt to changes. Thus, simple cause-and-consequence understandings of human-environment interactions are not sufficient (Fraser, et al., 2003).

Geographers have also considered the impact of social paradigm, or culture, in person-environment interactions. Proctor (1998) proposed conceptualizing culture as the pervasive dimension of meaning in social reality. He stated that accounts of global environmental change are naïve because they downplay the active role of humans in making sense of the world around them. Knowledge arises not just out of “direct and passive observation of the facts of the world, but rather out of active interplay between the knowing subject and the object of knowledge” (p. 238). Proctor proposed that we think of this fundamental human dimension of global environmental change as its “cultural dimension” where culture is understood in a symbolic sense as a process of

shared meaning, a means of making sense of reality. Culture is evidenced not only in attitudes and beliefs, but in behaviors (Proctor, 1998).

Greenberg (1984) concluded that, although social systems constrain individual choice, they do not completely destroy it. He suggested that the effects of capitalism can be linked to landscape transformation (Greenberg, 1984). Other geographers have advocated the adoption of the “adaptive approach” because it recognizes that formalized knowledge systems are always incomplete and there is an inherent “unknowability and unpredictability” in natural systems (Jay & Morad, 2002).

Humans perceive and interact with both natural and man-made, or built environments (Kearney, 2006; Kweon, Ellis, Lee, & Rogers, 2006) and much geographic research has focused on human interaction with the built environment (see, e.g., Golledge, 2002; Kearney, 2006; Kweon et al., 2006). “. . . the built environment is the spatial manifestation of human decision making and many of these decisions are related to the way in which we perceive space, evaluate the elements of space, and image the potential use of it.” (Golledge & Stimson, 1997, p. 195). People living in urban, compared to rural, environments perceive the natural environment differently. It is perhaps more important to note that people living in urban environments also perceive a different environment than do people living in rural environments. Those living in urban environments are exposed to more human-modified areas, and the extent of the modification by humans is generally more dramatic than those living in rural areas. Values of the natural environment may be enhanced by lack of exposure to it; people who have regular contact may tend to take it for granted.

Past research has shown a rural/urban divide in levels of concern for the environment, with those residing in urban areas expressing more concern for the environment than those living in rural areas (Duroy, 2005; Fransson & Garling, 1999; Hines, Hungerford, & Tomera, 1987) and being significantly more willing to pay to protect the environment (Duroy, 2005). Two theories have been proposed for this difference. Some researchers speculate that increased exposure to pollutants in urban settings increases environmental concern and values (Fransson & Garling, 1999). Other researchers posit that humans need nature (Duroy, 2005; Wilson, 1984; Louv, 2005). These researchers postulated that separation from nature has profound effects on humans (Wilson, 1984) and direct exposure to nature is necessary for healthy childhood development (Louv, 2005).

Urban-dwellers also generally rely much more on the efficient functioning of technology and the economy to obtain food and goods. In contrast, rural dwellers have access to land on which they can grow gardens and to forested areas in which they can hunt. Rural dwellers have more choices that will allow them not to rely on the economic system to provide them with food, compared to urban-dwellers. These contrasting relationships to the economic system may lead to differing values of the WISP between people who reside in urban and rural areas.

Hypothesis 2: Living in more highly built environments will correlate positively with pro-environmental values and the western industrialized social paradigm.

1.4 Other Social Paradigms

Although the WISP is one way of examining the human/environment relationship, research using the WISP has been limited. In the few studies that have examined the human/environment relationship directly, theoretical bases and methodologies have varied. It is fair to say that research in this area is in its infancy. Most research is qualitative and is based on case studies of different regions of the world (e.g., Bauer, 2006). Other studies remark on the human/environment relationship only as a side note to the primary issues that they address. Exploration of the potential range of relationships is important in an informational sense, and potentially to begin to understand how our current relationship developed, in order to understand how we might influence future evolution of that relationship. Assuming that the WISP may decrease the resilience of socio-ecological systems, it is also important to examine other ways of viewing the relationship between humans and the physical environment that might be incorporated into social institutions to increase human resilience, particularly in the face of change.

The WISP is not universally endorsed by all Americans or by all cultural groups within the United States: it does not accurately describe the social paradigm accepted by all individuals or groups internationally. The fact that the concepts underlying the WISP first gained wide-spread acceptance in western Europe implies that other areas of the world hold a different view of the relationship between humans and the environment. Research that has been conducted in many countries around the world assessing universal values held by all humans indicates that values correlated with higher values of the environment: benevolence and universalism, vary widely among countries (Schwartz,

1992; Schwartz & Bardi, 2001). This evidence further suggests that other countries may hold different views about our relationship to the physical world. Within the United States, there has been a long-standing debate about the relative environmental values of different ethnic groups, particularly of those between Euro-Americans and African-Americans. Yet, no research has been done to collect data on the human/environment relationship as it differs within the United States and across the world. If our social paradigm is maladaptive because it reduces our ability to accurately perceive feedback from or about the environment, or reduces our willingness to adapt, it is important to understand other paradigms regarding the human/environment relationship to increase models that we might choose to emulate.

Hypothesis 3: The western industrial social paradigm is not expressed at equal levels or in a conceptually coherent manner across different cultures within the United States or internationally.

Chapter 2 METHODS

2.1 Introduction

In this section a general description of the statistical analysis used is given. It is followed by a more detailed description of the statistical tests. Two databases were utilized to test my first hypothesis: the General Social Survey (GSS) database and the Kilbourne and Pickett database. Both databases are described in more detail below. Only the GSS database could be used to test my second hypothesis. Both the Kilbourne/Pickett and GSS databases had been coded for SPSS; and SPSS 16 for Mac was used to conduct all statistical analyses.

My approach was to assess the questions in the GSS database for the purpose of developing constructs to test my hypotheses. Those constructs were environmental concern and beliefs; environmental behaviors; and the western industrial social paradigm consisting of three factors, economic, political and technological. After determining variables that could be used to test each of these constructs, the constructs were statistically analyzed to assess correlation and reliability. For hypothesis one, the constructs were then assessed to determine the relationship between them and whether there was a significant effect of WISP on environmental concern and beliefs relating to environmental behaviors using mediation analysis as described in more detail below. For hypothesis two, the relationship between environmental concern and beliefs and built environment, as measured by size of population of the city of residence of the study participants was tested, as well as the relationship between the WISP and the size of the

population of the city of residence. The third hypothesis was supported by analysis of literature collected in other studies and in books.

For hypotheses one and two, initially, the wording of the questions used in both databases was reviewed to determine whether expressing agreement reflected a more favorable attitude toward the concept to be measured, or if some questions should be recoded to accomplish that goal. For example, the questions measuring economy were recoded as necessary so that a high score would signify high values for a growing economy.

After completing recoding, factor analysis was used to determine the contribution of each question to measurement of the construct². The purpose of conducting factor analysis was data reduction and because there was relatively strong theoretical support for the constructs and measurements, confirmatory factor analysis was used in the analysis rather than exploratory factor analysis. Those questions that did not significantly contribute to construct measurement, as determined by whether Cronbach's alpha was significantly improved if the variable was eliminated, were removed. The questions that were ultimately used to measure each of the factors and constructs are included in Appendix A. Following factor analysis, reliability of each of the factors was measured using Cronbach's alpha. Since one of the assumptions for use of Cronbach's alpha is that the factor is uni-dimensional, alpha measures of multi-dimensional constructs, such as the WISP, were conducted, but it is noted that such analysis violates statistical assumptions.

² Factor analysis was already conducted by Kilbourne and colleagues on the dataset he provided me, but the analysis was conducted again because my analysis and statistical methods differed from Kilbourne's (he and his colleagues used structural equation modeling) and as a check to make sure my analysis was solidly based.

2.2 Statistical Tests Used

The following statistical tests were used in analysis of the databases, unless otherwise noted in the more detailed description of each of the databases which follows.

2.2.1 *Factor Analysis*

Factor analysis is a technique used to discover simple patterns in the relationships among variables. Factor analysis identifies groups of variables correlating maximally with each other and minimally with other variables (Aron, Aron, & Coups, 2006). In the instant case, each question identified in the GSS database is one potential variable to be used to build a construct and test the hypotheses. Factor analysis was used to assess the relationship among the variables in order to eliminate those variables that did not significantly contribute to measurement of the construct. The extraction method used in all factor analyses done for this paper was principal components analysis.

Statistically, the relationship of the variables to each other are “rotated” to determine the grouping of the variables into factors. Two main types of rotation can be used. In this study, orthogonal rotation was used when it was logical to assume that the factors would remain uncorrelated. Oblique rotation was used when that assumption did not appear to be supported (Darlington, n.d.). The relationship of a variable in a factor, called its eigenvalue, is considered to be acceptable if it is at least 0.6 (Hair, Black, Babin, Anderson, & Tatham, 2006). Variables that did not have an eigenvalue of 0.6 or higher were eliminated.

2.2.2 Cronbach Alpha

Cronbach alpha is a measure of the internal consistency reliability of a construct, that is, the extent to which high responses correspond to high responses and low to low (Aron, et al., 2006). A Cronbach alpha value of 0.7 is considered “adequate” for social science research applications (Nunally, 1978).

2.2.3 Mediation Analysis

Mediation analysis measures the effect of one construct on two other constructs. The analysis determines whether a formerly significant correlation between two variables or constructs, in this research, the significant negative correlation between WISP and environmental behaviors is eliminated or reduced when environmental concern and beliefs, is included in predicting environmental behaviors (Baron and Kenny, 1986; Holmbeck, 1997). Regression analysis is used in mediation to determine the linear relationship between the constructs and the effect of the third construct on that linear relationship.

2.2.4 Pearson Chi Square

Chi Square is used to test how well an observed breakdown of nominal values fits the expected breakdown (or null hypothesis) for those variables. Chi square tests are reported by assessing the probability that the observed results significantly differ from the expected results. In this research, significance levels were set at 0.5 except where multiple tests increase the chances of obtaining a significant result. In those instances, Bonferroni’s technique was used to adjust the significance level to reduce the chance of a

type I error. The Bonferroni adjustment divides the significance level (0.5) by the number of tests to be conducted.

2.3 The Databases

2.3.1 *The Kilbourne and Pickett Database*

Dr. William Kilbourne provided me with the United States database he and his colleague, Gregory Pickett collected, and gave me permission to use it in my study. This database was used to test the first hypothesis. The data collection procedure for Kilbourne's study was a telephone survey of randomly selected adults (18 years old or older) in the United States conducted in 2005 (personal communication W.E. Kilbourne, January 5, 2009) by a research service: Scientific Telephone Samples. Interviewers called respondents, eliminated refusals, and replaced no-answers into the database 9 times before the telephone number was removed. Interviewers repeated the process until they finished the required number of interviews (Kilbourne & Pickett, 2008). No information was provided regarding the number of refusals, nor the number of unanswered calls, hence a response rate could not be calculated.

The final number of calls completed was 337. Of the total, 34 were eliminated by the researchers because of incomplete data. The final sample consisted of 303 respondents of which 44% were male. The median and average age of the respondents were both 48 years, which is slightly higher than the median of this age group in the U.S. population (44 years). Fifty-five percent (55%) had some college and 20% had completed a four-year degree. The median family income for the sample was approximately

\$45,000. Thus, the sample was a reasonable representation of the U.S. population for all of the demographics measured (Kilbourne & Pickett, 2008).

2.3.1.1 *Measurement Instruments*

The questionnaire for Kilbourne and Pickett's study consisted of eight sections with seven measuring different constructs and the last section measuring demographics. The measures used in this study from the Kilbourne/Pickett database include an environmental concern scale, the six factors of the DSP scale (described below), and a measure of environmental behaviors. The questionnaire used for the survey is attached as Appendix B.

Of the scales in the database, those used in the present study were the environmental concern scale, the DSP scale and environmental behaviors. With the exception of the environmental behaviors measure, all the items in the scales were Likert type with 1 indicating Strongly Disagree and 7 indicating Strongly Agree. The eight behavioral questions were yes/no regarding the specific behavior.

2.3.1.1.1 *Environmental concern scale.*

This scale assessed the respondent's environmental concern and belief that individual, social, and political changes were necessary to reduce damage to the environment. Although the scale was intended to assess two factors: individual concern and social concern, Kilbourne and Pickett (2008) reported that exploratory factor analysis indicated only one factor explaining 55% of the variance. The six items in this factor measured concern about environmental abuse, importance of limiting consumption, political and social change, and stricter enforcement of environmental laws.

2.3.1.1.2 *Environmental behavior scale.*

Kilbourne and Pickett's questionnaire included two relevant types of ERBs, direct and indirect. Four items measured purchase actions perceived to have positive effects on the environment if many people exhibit them. The items related to purchasing environmentally friendly products, organic products, products that reduce household waste, and products that contain recycled material. Indirect behaviors were measured by questions assessing whether the respondent had joined environmental organizations, contributed money to environmental organizations, subscribed to environmental magazines, and contacted a legislative policy maker. All of the questions assessed self-reported behaviors and were answered yes or no. Kilbourne and Pickett (2008) conducted exploratory factor analysis on the items to determine if they reflected different types of behaviors. The results of the analysis indicated two factors explaining 54% of the variance. The two factors separated the items as intended with the first factor containing direct actions and the second containing indirect actions. As argued by Stern (2000) and Dietz and colleagues (1998), these types of behavior should be distinguished from each other.

2.3.1.1.3 *DSP scale.*

The DSP scale used in this survey consisted of six dimensions: economic, technological, political, anthropocentric, competition, and atomism. Justification for inclusion of the economic, technological and political dimensions has been established previously in this paper. For justification of inclusion of the anthropocentrism, competition and atomism dimensions, the reader is referred to Kilbourne & Pickett

(2008). Appendix B includes the questions organized according to factors that were used to measure the dominant social paradigm construct.

2.3.2 The GSS Database

The General Social Survey (GSS) was used to test hypotheses one and two. The GSS is a survey that was conducted each year from 1972 to 1993, except 1979, 1981, and 1992; and in even years from 1994 to 2006 (1994, 1996, 1998, 2000, 2002, 2004, and 2006) (Davis & Smith, 1972-2006). Each year the survey is administered, a random sample representative of the United States population is generated by National Opinion Research Center (NORC). Face-to-face interviews are conducted by interviewers trained by NORC.

The codebook for the GSS is over 2500 pages long, so a comprehensive list of the questions asked would neither be possible, nor relevant for this paper. The questions relevant to my study included those that related to environmental concerns and beliefs, three factors included in the dominant social paradigm, and environmental behaviors. In conducting analysis with the GSS database, only the WISP factors economic, political and technological were used because I was unable to identify questions that might measure atomism, competition and anthropocentrism.

2.3.2.1 Question Assessment Procedure

All of the questions listed in the GSS codebook were reviewed for relevance to measurement of the constructs contained in my hypotheses, as listed above. For example, questions concerning belief in laissez-faire government were listed as potential measures of the political dimension of the WISP; questions about faith in a strong and growing

economy were listed as potentially relevant to assessment of the economic dimension; and questions that appeared to measure belief in technology were categorized to measure that dimension. Additionally, questions assessing environmental beliefs and concern were listed as potential measures of the construct “environmental concern and beliefs”; and questions assessing environmental behaviors were listed as potential variables to measure that construct.

The year or years that the question was asked in the GSS survey were also recorded in the initial evaluation of the questions. Although the questions from all the years that the GSS has been administered were reviewed, it was important to obtain the most recent year that a sufficient number of questions were asked to assess each of the constructs. This was an important consideration since recent data will be more relevant to our current social situation and values than older data will be. A determination was then made of which year contained sufficient questions in each construct to adequately test the hypotheses and to be sufficiently recent to be relevant to the study. It was determined that the year 2000 could be used, although there were a limited number of questions to assess technology, as explained more fully below. The questions from the year 2000 on which statistical analysis was conducted are attached to this dissertation as appendix C. The sample size for the 2000 GSS survey is 2,817. There is no information given on response rate in the codebook.

2.3.2.2 Constructs Utilized

2.3.2.2.1 Environmental concern and beliefs.

Psychologists have defined thoughts about the favorable or unfavorable evaluations one makes about a particular thing as beliefs (Kenrick, Neuberg, & Cialdini, 2007). Concerns have been less well-defined in the psychological literature, and distinctions between concern and beliefs have been blurred. Webster's dictionary defines concerns as "to be a care, trouble, or distress to" (Webster's, 1989). This implies that beliefs usually involve a process of evaluation and are more specific compared to concerns. After conducting factor analysis and assessing the reliability of the variables used to measure each construct using Cronbach's alpha test, two factors were identified as described more specifically below. Environmental concerns were measured using two questions that relate to general beliefs about human actions harming the environment. Environmental beliefs were assessed using six questions that relate to the harm caused to the environment by specific sources of pollution or toxins.

2.3.2.2.2 Environmental behaviors.

Following factor analysis and analysis using Cronbach's alpha, the questions assessing environmental behaviors in the GSS included both behavioral intentions and actual behaviors. Behavioral intentions included questions addressing willingness to pay higher prices, higher taxes and accept cuts to standard of living in order to protect the environment. Questions related to actual environmental behaviors included both specific and general questions. Specific questions asked whether respondent was a member of an environmental group, had signed an environmental petition, had given money to an

environmental group, whether he or she had taken place in a demonstration and how often he or she made an effort to recycle. The single general question asked if the respondent did what was right for the environment even when it cost more money or took more time.

2.3.2.2.3 The western industrial social paradigm.

2.3.2.2.3.1 Economic. Questions used to assess a respondent's belief in the value of a strong and growing economy initially included seven questions. After factor analysis, and in order to obtain an adequate alpha for the factor, the questions were reduced to two asking whether the respondent felt that Americans worry too much about the environment and not enough about prices and jobs and whether we worry too much about human progress harming the environment.

2.3.2.2.3.2 Political. After factor analysis and assessment of Cronbach alpha, two questions expressing the belief that government should have a limited role were used to assess the political dimension of the WISP. These questions asked whether government or people should decide how to protect the environment, and whether government or business should decide how to protect the environment.

2.3.2.2.3.3 Technological. Only two questions relevant to the technological dimension of the DSP could be identified in the year 2000 questionnaire. These two questions were: "Overall, science does more harm than good" and "Modern science will solve our environmental problems with little change to our way of life." Even after recoding the questions to make them consistent, factor analysis indicated that they had a negative correlation to each other. Thus, only one question was used in the analysis:

“Modern science will solve our environmental problems with little change to our way of life.” This question was selected because, given the negative relationship between the questions, only one could be used and because it most closely reflects the ideas of the dominant social paradigm as expressed by Kilbourne and colleagues.

2.4 Hypothesis One

For hypothesis 1: *The dominant social paradigm will reduce environmental concern when WISP is strong, or increase environmental concern when WISP is weak. The western industrial social paradigm impacts environmental behaviors by affecting our concern for the environment.* I used the technique developed by Holmbeck (1997) to assess whether the WISP mediated the relationship from environmental concern and values to environmentally responsible behaviors. As described by Holmbeck (1997) and by Baron and Kenny (1986) to determine whether a construct acts as a mediator, the following analysis is conducted:

- A. Examine the bivariate regression between the WISP and environmental beliefs and concerns.
- B. Examine the bivariate regression between the WISP and environmentally responsible behaviors.
- C. Examine the bivariate regression between environmental concern and beliefs and environmentally responsible behaviors.
- D. Examine the regression when both the WISP and environmental beliefs and concerns predict environmental behaviors.

The analysis is visually illustrated in Figure 1 below.

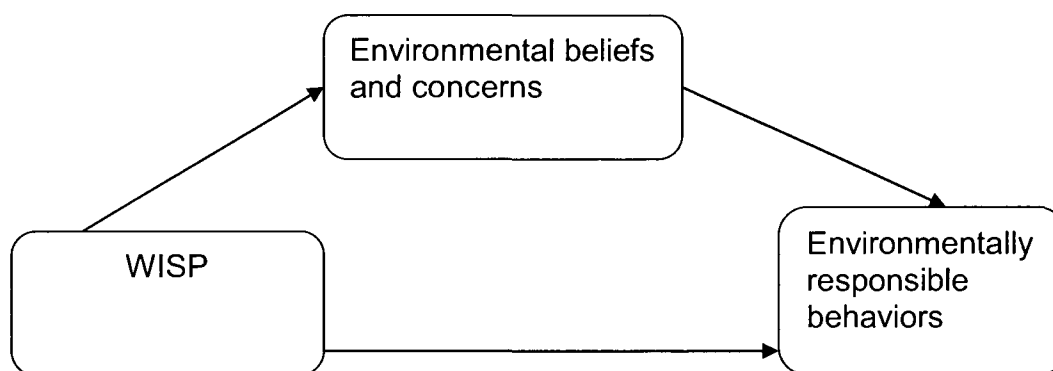


Figure 1: Visual representation of the hypothesized effect of the dominant social paradigm on the relationship between environmental concern and environmental behaviors.

This analysis is justified in circumstances in which the theoretical basis is strong. Based on my readings set forth above, it is my belief that there is a sufficient theoretical basis for this analysis. The described analysis was performed using both the Kilbourne database and the GSS database.

2.5 Hypothesis Two

Hypothesis 2 posits that: *Living in more highly built environments will correlate positively with pro-environmental values and the western industrialized social paradigm.*

The GSS database contains information from each respondent on the size of city in which the respondent resided at the time of the interview, divided into categories as described below. Since the actual place of residence of the respondent was not solicited as part of the GSS (no geographic information such as name of city, postal code or address was asked), I will have to make the assumption that increased city size corresponds with increased amount of built environment. That is, the larger the population of the city, the more built environment there will be. Kilbourne and Pickett

(2008) did not gather any data on the place of residence of their study participants, therefore this hypothesis could not be tested using that database.

The sizes of city into which the data contained in the GSS are coded are: cities with populations greater than 250,000 (large cities); cities with populations between 50,000 and 249,999 (medium-sized cities); suburbs of cities with populations greater than 250,000 (suburbs of large cities); suburbs of cities with populations between 50,000 and 249,999 (suburbs of medium-sized cities); unincorporated cities with populations greater than 250,000; unincorporated cities with populations between 50,000 and 249,999; areas with populations between 10,000 and 49,999 (small cities); areas with populations between 2,500 and 9,999 (towns); areas with populations between 1,000 and 2,499 (small towns); and areas characterized as “open country” by the GSS researchers, which assumedly have population densities lower than 1,000. Since there was no reason for purposes of this analysis to distinguish between cities that were and were not incorporated, the data were recoded to combine unincorporated and incorporated cities with populations above 250,000 together and to combine incorporated and unincorporated medium-sized cities together. Because people living in the suburbs of big and medium-sized cities may have differing experiences of built environments than those who live primarily in cities, the suburb categories were maintained in order to investigate whether there would be any differences between suburbs and cities.

After adjusting the data for size of cities, the environmental concern and belief scale and the WISP scale were dichotomized so that respondents whose combined score on either scale was below the mid-point were categorized as low environmental concern

and beliefs and low WISP and those above the mid-point were categorized as high environmental concern and beliefs and high WISP.

2.6 Hypothesis Three

Hypothesis 3 states: *The western industrial social paradigm is not expressed at equal levels or in a conceptually coherent manner across different cultures within the United States or internationally.* Analysis of the literature was used to test this hypothesis. Specifically, literature assessing the relationship between humans and their environment in both in the United States and in other countries was analyzed. One limitation of the study is that the review was limited to those journal articles and books that were available in English. The search of available articles and books was conducted in databases available through the library at the University of Alaska, Fairbanks, those available through the library at the University of Alaska, Anchorage and on Google™ scholar. Thousands of abstracts of potential articles were read and assessed for their potential relevance to the question of social paradigm and its effect on human environmental values and behaviors. Well over one hundred articles and at least six books were read to develop a knowledge base sufficient to address this hypothesis, but only the most relevant of those journal articles and books were used in writing this dissertation.

Chapter 3 RESULTS

3.1 Introduction

The following three hypotheses were tested. One, based on the mixed messages received by Americans, I predict that the dominant social paradigm will tend to reduce environmental concern when WISP is strong, or to increase environmental concern when WISP is weak. The western industrial social paradigm impacts environmental behaviors by affecting our concern for the environment. Two, based on this research, I predict that people living in more highly built environments will be positively correlated with pro-environmental values, as well as with the industrialized western dominant social paradigm. Three, the western industrial social paradigm is not expressed at equal levels or in a conceptually coherent manner across different cultures within the United States or internationally.

3.2 Hypothesis One

The dominant social paradigm will reduce environmental concern when WISP is strong, or increase environmental concern when WISP is weak. The western industrial social paradigm impacts environmental behaviors by affecting our concern for the environment.

Analysis of results for hypothesis 1 will be divided into a discussion of the development of the individual constructs used from the GSS database, followed by a discussion of the results of mediation analysis for the GSS database. The results of mediation analysis of the Kilbourne database follows.

3.2.1 *General Social Survey Database*

3.2.1.1 *Development of Constructs*

3.2.1.1.1 *Environmental concern and beliefs.*

Factor analysis, using varimax rotation, of the questions assessing environmental concern and beliefs yielded three factors. One of the factors included specific questions worded almost identically assessing whether the respondent felt that: “In general, do you think that air pollution caused by industry is extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can’t choose, no answer, not applicable?” The other questions falling into this factor used the same wording as above and asked about air pollution caused by cars; pesticides and chemicals used in farming; water pollution of America’s rivers, lakes and streams; and rise in the world’s temperatures caused by the ‘greenhouse effect.’ In total, there were six questions included in this factor. These questions imply evaluation, and would likely be characterized as beliefs.

The second factor included the two questions: “Almost everything we do in life harms the environment” and “The earth cannot continue to support population growth at its present rate,” both assessed on a Likert scale of strongly agree, agree, neither agree nor disagree, disagree, strongly disagree and non-responsive answers. Because these questions relate more to a care, trouble or distress and do not imply evaluation, these questions would be characterized as concerns.

The third factor consisted of four questions: “There are more important things to do in life than protect the environment;” “There is no point in doing what I can for the

environment unless others do the same;” “It is just too difficult for someone like me to do much about the environment;” and “Many of the claims about environmental threats are exaggerated.” All of these questions were also measured on the five point Likert scale described above (strongly agree to strongly disagree).

It is likely that the questions divided into these three factors for the following reasons. The questions identified as belonging to the first factor are distinguished from the others by being much more specific than those identified as belonging to the second and third factors. The second factor relates to concerns about human actions harming the environment, and the questions identified as belonging to the third factor relate to belief in the validity of environmental claims or in the efficacy of taking action to correct environmental problems.

All of the questions (and all three factors) were entered into SPSS to determine the alpha level of the variables. The alpha level for all of the factors was acceptable at 0.760 (0.777 based on standardized items) since a Cronbach alpha of 0.70 is considered to be an acceptable lower limit (Hair, et al., 2006). Assessment of the effect on the alpha level if any of the items were removed revealed that alpha could be improved by eliminating the variables measuring the third factor. Because the questions contained in the third factor also relate to whether people view environmental claims to be valid and whether taking action will be effective, by eliminating this factor, face validity of environmental concern and beliefs should also be improved.

Research conducted by Fransson and Garling (1999) suggested that measures of environmental concern should include both narrow and more general measures, which

was accomplished in this study by combining the first and second factors identified above into one construct. The mean of the variables included in both factors was calculated in order to create a new variable titled environmental concern and beliefs, with an alpha of 0.801 (0.813 standardized).

3.2.1.1.2 *Environmental behaviors.*

Nine potential questions were included as variables in the construct environmental behaviors. These included three questions assessing behavioral intentions measured by willingness to: “pay much higher prices in order to protect the environment”; “to pay much higher taxes in order to protect the environment”; and “to accept cuts in your standard of living in order to protect the environment.” A second set of six questions assessed actual behaviors, including how often the respondent recycled, whether they were a member of an environmental group, whether they had signed an environmental petition, donated money to an environmental group, or participated in a demonstration about an environmental issue within the past five years. Finally, respondents were asked if they did what was right for the environment “even when it cost more money or took more time.”

Factor analysis indicated that environmental behaviors formed two factors divided by behavioral intentions and actual behaviors. However, two of the questions assessing actual behaviors: the recycling question and the question asking how often the respondent did what was right for the environment did not have factor loadings above 0.6, so these two questions were eliminated. Cronbach alpha of the combined two factors with seven questions yielded an acceptable 0.726 (0.726 standardized). Stern (2000) argues that one

problem with measurement of environmental behaviors is that it is not a one-dimensional construct, and studies cited above suggest that different people may have different motivations for environmental behaviors, thus including both actual and intended behaviors may benefit analysis. The sum of the seven variables used to assess environmental behaviors was calculated to create the overall variable, environmental behaviors.

3.2.1.1.3 *The western industrial social paradigm.*

3.2.1.1.3.1 Economic. The initial seven questions used to assess belief in a growing economy grouped into 3 factors. One of the questions which posited that “economic growth in the United States would slow down unless we look after the environment better” did not have a factor loading above 0.6, and that question was eliminated. Subsequent factor analysis resulted in the elimination of two other questions that loaded below 0.6: “Economic growth always harms the environment;” and “In order to protect the environment, America needs economic growth.”

The remaining four questions grouped into two factors with loadings above 0.6. One factor containing two questions assessed the importance of the environment relative to jobs, to prices and to progress. The Cronbach alpha for this factor is 0.687 (0.691 standardized). The other factor contained two questions, one assessed the belief that great differences in wealth are necessary in a free society and the other assessed whether private enterprise is the best means to solve America’s economic problems. The alpha for this factor was not acceptable, at 0.385 (0.392), with the alpha for the combined two factors at 0.371 (0.377). On the basis of this analysis, the economy construct was

measured using the two questions that resulted in an alpha of 0.687. The mean of these two variables was calculated to create an economy construct.

3.2.1.1.3.2 Political. Four questions were initially identified as possible variables to assess belief in a laissez-faire government. Those four questions included whether government or people should decide how to protect the environment, whether government or business should decide how to protect the environment, whether government was doing too much that should be left to business and individuals, and a question asking the respondent's level of agreement with the statement "freedom is having a government that doesn't spy on me or interfere in my life." All questions loaded on one factor, but two of the questions had factor loadings below 0.6. The two remaining questions asked whether decisions about the environment should be left to people or to the government and whether decisions about the environment should be left to business or to the government. The alpha of these two questions, however, was low at 0.501 (0.512 standardized). Because no other questions that would be adequate to measure this construct could be identified, these questions were used in the analysis. The mean of these two variables was calculated to create a political construct.

3.2.1.1.3.3 Technological. I was able to identify only two potential questions for measuring the technology component of the WISP. Those two questions were: "Overall, modern science does more harm than good," assessed on a 5 point Likert scale from strongly agree to strongly disagree. The other question was "Modern science will solve our environmental problems with little change to our way of life," assessed on the same 5 point Likert scale. I recoded the first question to be consistent with the second question

so that a high score would reflect faith in technology. Both questions loaded on one factor, but the Cronbach alpha was a very low 0.190, and there was a negative average covariance between the two items. Based on these considerations, I decided to use only the question asking if technology would solve our environmental problems, since it most closely reflects the issue of importance to my study.

3.2.1.1.3.4 WISP combined. Analysis of the Cronbach alpha measure of the combined two questions based on faith in economic growth, the two assessing belief in laissez-faire government and the one related to technology indicated a value of 0.600 (0.616 standardized), and factor analysis indicated three distinct factors for the combined measure. Although the alpha for the WISP as a construct is below the acceptable level of 0.7, one of the assumptions underlying this analysis is that a uni-dimensional construct is being measured (Hair, et al., 2006), and the WISP is tri-dimensional. The economy dimension has an acceptable alpha level. The political dimension was below the acceptable level, at 0.500 alpha, so it is not surprising that the combined WISP would be below the 0.7 level considered to be acceptable. An alpha analysis of technology cannot be conducted because it is a single variable. The mean of the five variables was calculated for the construct WISP.

3.2.2 *Mediation Analysis*

Hypothesis one states: Based on the mixed messages received by Americans, I predict that the dominant social paradigm will mediate the link between environmental concern and values and environmentally responsible behaviors. As suggested by Baron and Kenny (1986) and verified by Holmbeck (1997), I used the following analysis to

determine whether the WISP reduces environmental concern, thereby also reducing environmental behaviors. These analyses were conducted using both the GSS database and the Kilbourne database.

- A. Examine the bivariate regression between the WISP and environmental beliefs and concerns.
- B. Examine the bivariate regression between the WISP and environmentally responsible behaviors.
- C. Examine the bivariate regression between environmental concern and beliefs and environmentally responsible behaviors.
- D. Examine the regression when both the WISP and environmental beliefs and concerns predict environmental behaviors.

3.2.2.1 GSS Database

The bivariate regression between the WISP and environmental behaviors yielded a significant negative relationship with $F(1, 1246) = 166.24, p < 0.01 (\beta = -0.343)$. In the second step of the analysis environmental concern was significantly positively related to environmental behaviors with the following results: $F(1, 1244) = 123.03, p < 0.01 (\beta = 0.300)$. The bivariate relationship between the WISP and environmental concern yielded the following result: $F(1, 1245) = 46.71, p < 0.01 (\beta = -0.190)$. Using simultaneous entry multiple regression and entering environmental behaviors as the dependent variable, and environmental concern and the WISP as independent variables, the relationship between WISP and environmental behaviors remained significant so full mediation was not achieved, however, the effect of WISP on environmental behaviors was reduced, $F(2,$

1240) = 131.82, $p < 0.01$ ($\beta = -0.294$). The correlations are illustrated in Figure 2 below. The amount of variance explained by inclusion of WISP and environmental concern and beliefs in predicting environmental behaviors was $r^2 = .175$, $p < .01$.

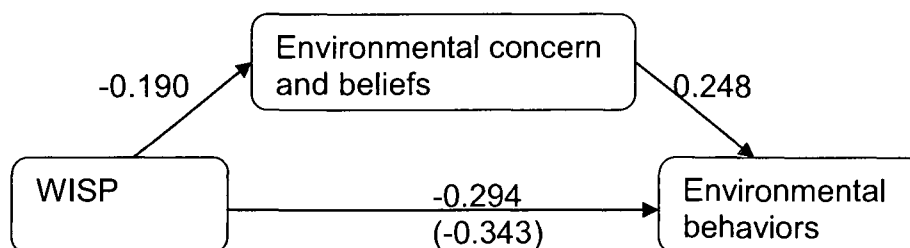


Figure 2: GSS database - β coefficient values between WISP, environmental concern and beliefs and environmental behaviors. The β coefficient value in parenthesis is the value when environmental concern and beliefs predict environmental behaviors.

To determine whether WISP partially mediates the relationship between environmental concern and beliefs and environmental behaviors, a modified Sobel test (Baron & Kenny, 1986) was conducted using the Preacher and Leonardelli (n.d.) website. The test indicated that the inclusion of WISP significantly decreased the influence of environmental concern on environmental behaviors, Sobel's $z = -4.96$, $p < .01$. This suggests that WISP reduces concern for the environment, thereby reducing environmental behaviors.

3.2.2.2 Kilbourne and Pickett Database

The same analysis was conducted using the Kilbourne and Pickett database, with the following results: The bivariate regression between the WISP and environmental concern resulted in $F(1, 301) = 5.55$, $p = 0.019$ ($\beta = -0.135$), indicating a significant negative relationship. In the second step, regression of environmental concern to

environmental behaviors, the relationship was significant and positive: $F(1, 301) = 49.28$, $p < 0.01$ ($\beta = 0.375$). Regression of the WISP and environmental behaviors also yielded a significant negative relationship (at $p < .01$) with $F(1, 302) = 17.67$, $p < 0.01$ ($\beta = -0.87$). Multiple regression using simultaneous entry of environmental concern and the WISP on environmental behaviors yielded the same result as analysis of the GSS database. The effect of WISP on environmental behaviors continued to be significant, but was reduced. Graphic representation of the relationships is illustrated in Figure 3 below. The amount of variance explained by prediction of environmental behaviors by both WISP and by environmental concerns and beliefs was $r^2 = .176$, $p < .01$.

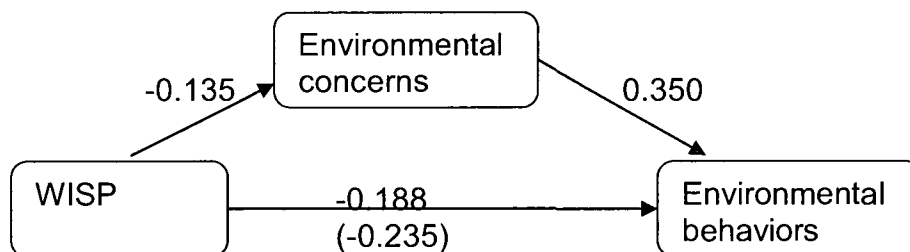


Figure 3: Kilbourne & Pickett database - β coefficient values between WISP, environmental concern and beliefs and environmental behaviors. The β coefficient value in parenthesis is the value when environmental concern predicts environmental behaviors.

Again, to determine whether WISP partially mediates the relationship between environmental concern and beliefs and environmental behaviors, a modified Sobel test (Baron & Kenny, 1986) was conducted using the Preacher and Leonardelli (n.d.) website. The results were similar to those resulting from the modified Sobel test of the GSS database, indicating that the inclusion of WISP significantly decreased the influence of environmental concern on environmental behaviors, Sobel's $z = -2.22$, $p = .026$.

3.3 Hypothesis Two

Living in more highly built environments will correlate positively with pro-environmental values and the western industrialized social paradigm.

Using the variables adjusted as described above, a cross-tabs analysis was run for city size, as a proxy for amount of built environment, and environmental concern and beliefs. With a Pearson $\chi^2=.141$, $p<.01$, Cramer's $V=.117$, the data suggest a significant relationship between built environment and environmental concern and beliefs. A cross-tabs analysis was also run between city size and the dichotomized WISP measure. The comparison indicated that there was a significant relationship between city size and high and low values of the WISP, with Pearson $\chi^2=.246$, $p=.001$, Cramer's $V=.069$. In order to determine which of the relationships among the 28 possible combinations (there were 7 categories of size of place of residence) were significant, each category was compared to all the other categories. The large number of comparisons required making an adjustment to the significance level in order to avoid making a type 1 error. The Bonferroni method was used to make the adjustment; a level of $p=.0017$ ($.05/28$) was required for significance. The results of the comparisons between city size and high and low environmental concern and beliefs are attached as Table 1. For the comparisons that were significant, the χ^2 value, p level and Cramer's V are reported. These statistics are also reported for the comparisons that would have been significant without the Bonferroni adjustment, and it is also noted where the results are not significant (*n.s.*). A similar table reporting the comparisons between built environment and WISP is included below as Table 2.

3.3.1 *Built Environment and Environmental Concern and Belief*

Table 1 compares size of city of residence of respondents to high and low values of environmental concern and beliefs. As Table 1 reflects, people living in areas characterized by the GSS as “open country” and those living in small towns with populations of 1,000 to 2,499 differed significantly in their level of environmental concern with all other population sizes. There was not a significant difference in concern and beliefs between people living in open country and those in small towns. Those living in small cities (population 2,500 to 9,999) had significantly different environmental concerns and beliefs than all other populations except those living in medium-sized cities (population 50,000 to 249,999). Examination of the relationships by comparing the number of people reporting high and low values with the expected count suggests that people living in places with lower populations, and less built space, are significantly more environmentally concerned than those who reside in larger cities. Respondents living in cities with populations of 10,000 or more, did not report significantly different environmental concern and beliefs. This result clearly contradicts hypothesis 2 with regard to environmental concern and beliefs. The trend in this table appears to be quite clear.

Table 1:
Crosstabs analysis of city residence size and environmental concern and beliefs.

Population size	City greater than 250,000	50,000 to 249,999	Suburb of city > 250,000	Suburb of city 50K to 249,999	10K to 49,999	2500 to 9999	1000 to 2499
50,000 to 249,999	<i>n.s.</i>						
Suburb of city > 250,000	<i>n.s.</i>	<i>n.s.</i>					
Suburb of city 50K to 249,999	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>				
10K to 49,999	<i>n.s.</i> $\chi^2=8.50$ $p=.014$ Cramer's V=.089	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>			
2500 to 9999	$\chi^2=.182$ $p<.01$ Cramer's V=.134	<i>n.s.</i> $\chi^2=.148$ $p=.01$ Cramer's V=.110	$\chi^2=.154$ $p<.01$ Cramer's V=.105	$\chi^2=.107$ $p<.01$ Cramer's V=.085	$\chi^2=.128$ $p<.01$ Cramer's V=.096		
1000 to 2499	$\chi^2=.320$ $p<.01$ Cramer's V=.149	$\chi^2=.375$ $p<.01$ Cramer's V=.152	$\chi^2=.505$ $p<.01$ Cramer's V=.167	$\chi^2=.398$ $p<.01$ Cramer's V=.144	$\chi^2=.568$ $p<.01$ Cramer's V=.177	<i>n.s.</i> $\chi^2=.182$ $p=.007$ Cramer's V=.102	
Open Country	$\chi^2=.367$ $p<.01$ Cramer's V=.264	$\chi^2=.359$ $p<.01$ Cramer's V=.223	$\chi^2=.386$ $p<.01$ Cramer's V=.206	$\chi^2=.329$ $p<.01$ Cramer's V=.181	$\chi^2=.379$ $p<.01$ Cramer's V=.205	$\chi^2=.158$ $p<.01$ Cramer's V=.136	$\chi^2=9.95$ $p<.01$ Cramer's V=.089

The required significance level is 0.017 (0.5/28).

3.3.2 Built Environment and Values of WISP

Although the trend between built environment and WISP is less straightforward than that between built environment and environmental concern, there are discernible

patterns. As indicated in Table 2 below, residents of medium-sized cities (population 50,000 to 249,999) differed significantly in WISP values from all other population categories except those living in large cities and those living in towns with a population from 1,000 to 2,499. Examination of the measured and expected values indicates that those living in medium-sized cities had significantly higher values of the WISP than those living in areas of any other population size except those living in towns, as indicated above.

Additionally, the WISP values of those respondents living in open country tended to significantly differ from respondents living in larger cities. The three exceptions were: between respondents living in open country and those living in large cities with populations exceeding 250,000, those living in suburbs of medium-sized cities, and those living in towns with populations of 2,500 to 9,999. Examination of the expected and counted values indicates that those living in open country had significantly lower WISP values than those living in more populated areas, with the exceptions stated above.

The other trend in the data was that those living in mid-sized cities (50,000 to 249,999 occupants) differed significantly than places with population sizes below theirs, and with suburbs of the same population size.³ An analysis of the expected and actual outcomes indicates that people living in mid-sized cities tended to express higher WISP values. For those living in towns, there was only one population group from which they significantly differed which was those living in the suburbs of medium-sized cities. For these two groups, the residents of towns reported higher values of the WISP than those

³ The exception to this trend is for towns sized 1,000 to 2,499 which were not significantly different.

living in suburbs. The results of the analysis partially supported hypothesis two because those living in mid-sized cities had significantly higher WISP values than other areas. The results suggest that respondents living in open country had lower WISP values than those in more populated areas, with three exceptions. These results neither support nor contradict hypothesis 2.

Table 2
Crosstabs analysis of city residence size and dominant social paradigm values.

	City greater than 250,000	50,000 to 249,999	Suburb of city > 250,000	Suburb of city 50K to 249,999	10K to 49,999	2500 to 9999	1000 to 2499
50,000 to 249,999	<i>n.s.</i> (<i>p</i> =0.58)						
Suburb of city > 250,000	<i>n.s.</i>	<i>n.s.</i> $\chi^2=6.63$ <i>p</i> =.01 Cramer's V=.0756					
Suburb of city 50K to 249,999	<i>n.s.</i>	$\chi^2=.187$ <i>p</i> <.001 Cramer's V=.122	<i>n.s.</i> $\chi^2=.10$ <i>p</i> =.043 Cramer's V=.051				
10K to 49,999	<i>n.s.</i>	$\chi^2=9.98$ <i>p</i> =.002 Cramer's V=.092	<i>n.s.</i>	<i>n.s.</i>			
2500 to 9999	<i>n.s.</i>	$\chi^2=.119$ <i>p</i> <.001 Cramer's V=.104	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>		
1000 to 2499	<i>n.s.</i>	<i>n.s.</i>	<i>n.s.</i>	$\chi^2=.104$ <i>p</i> <.001 Cramer's V=.073	<i>n.s.</i>	<i>n.s.</i> $\chi^2=4.51$ <i>p</i> =.034 Cramer's V=.05	
Open Country	<i>n.s.</i> $\chi^2=.50$ <i>p</i> =.011 Cramer's V=.125	$\chi^2=.219$ <i>p</i> <.001 Cramer's V=.188	$\chi^2=9.50$ <i>p</i> <.001 Cramer's V=.101	<i>n.s.</i>	$\chi^2=6.96$ <i>p</i> <.001 Cramer's V=.086	<i>n.s.</i> $\chi^2=5.54$ <i>p</i> =0.02 Cramer's V=.08	$\chi^2=.144$ <i>p</i> <0.001 Cramer's V=.105

The required significance level is 0.017.

3.4 Hypothesis Three

The Western Industrial Social Paradigm is not expressed at equal levels or in a conceptually coherent manner across different cultures within the United States or internationally.

3.4.1 *The United States*

There is evidence, even within the United States, which ranks highest of any country in WISP values (Kilbourne, & Pickett, 2008), that the WISP values are not universally accepted. Twelve percent (12%) of the randomly selected American adults in the Kilbourne database ($N = 303$) scored below 4.0 on the WISP scale (measured on a 7 point Likert scale, with 4 being neutral), indicating that, overall, they disagreed with the values expressed by the WISP. In the questionnaires completed in the year 2000 for the General Social Survey, ($N = 2,817$) a surprisingly high 44% of participants scored below the mid-point of the WISP scale constructed from that data. The results from these databases suggest that some percentage of people in America question the values of the WISP.

As described in more detail above, the dominant social paradigm (DSP) was formulated by Kilbourne and colleagues from a review of the values promulgated by western European societies starting about the time of the Enlightenment. The New Environmental Paradigm (NEP), a counterpoint to the WISP, is a scale of environmental concern or attitudes developed by Dunlap and Van Liere in 1978 and revised and renamed the New Ecological Paradigm in 2000 (Dunlap, Van Liere, Mertig, & Jones, 2000). Dunlap and Van Liere (1978) called the predominant relationship between

humans and nature the “Human Exceptionalist Paradigm (HEP)”, which theorizes values of the environment similar to the WISP. These researchers did not conceptualize the dimensions of the NEP. The NEP was constructed to measure what Dunlap and Van Liere (1978) theorized was a new view of the human/environment relationship emerging during the 1970s. Both the WISP and the NEP are measures of values of the environment. The NEP is a measure of environmental attitudes favoring protection of the environment, which these researchers conceptualized as being dichotomous with the WISP (Dunlap & Van Liere, 1978; Dunlap, et al., 2000). The NEP includes questions assessing opinions about limits to growth of human populations, limits to resource use, human ability to disrupt the balance of nature, the right of humans to modify nature and whether modification has reached the extent of abuse of nature. The western industrial social paradigm is a construct measuring one’s attitudes in support of continued growth and domination of nature. Although the values expressed by the WISP originated in western Europe, many of these values may be spread through globalization.

Since the NEP can be construed as the reverse of the values of the WISP, research in this area is instructive of views of the human/environment relationship, and counter-views to the WISP. Two methods have been used to test whether the NEP measures the same construct across ethnicities within the United States. Factor analysis has been used to determine how individuals group the questions in the NEP together. Floyd and Noe (1993) conducted a telephone survey of a representative sample of the general population of south Florida residents. They divided their data into Latino and non-Latino respondents. Using factor analysis, they reported that the NEP was bi-dimensional (two

factors) for non-Latino survey participants, but tri-dimensional (three factors) for Latino survey participants. These results differ from Dunlap and colleagues' (2000) conclusion that the NEP has five factors. Additionally, these results indicate that, in south Florida, Latinos view the NEP differently than do non-Latinos (Floyd & Noe, 1993). These results suggest that the human/environment relationship is viewed differently by Latino study participants because they view the NEP as grouping differently than did other study participants.

Another statistical method used to test reliability of a scale among different groups is Cronbach's alpha. As noted above, a value of 0.7 is considered "adequate" for social science research applications (Nunnally, 1978). When Cronbach's alpha has been reported for the NEP scale, the value was 0.82 for Euro-Americans and 0.74 for African-Americans (Parker & McDonough, 1999), suggesting that the NEP is a reliable metric for both groups, but has a lower reliability when testing African-Americans, perhaps because African-Americans perceive the concepts differently than do Euro-Americans. In addition to analyzing the NEP using factor analysis, Floyd and Noe (1993) tested the reliability of the NEP using Cronbach's alpha. In general, the values they reported also indicate reliable, but lower, Cronbach alpha scores for Latinos in south Florida compared to non-Latinos. There appear to be no studies analyzing the reliability of the NEP for other ethnic groups, such as Native Americans or Asians, nor testing the WISP for these groups.

Another study tested whether the NEP, as a "folk ecology" is consistent among ethnic groups (Johnson, Bowker, & Cordell, 2004). The model predicted that

environmental attitudes and beliefs related to race would influence both NEP scores and environmental behavior. Data were obtained from the 2000 National Survey on Recreation and the Environment (NSRE), which included the NEP. The sample respondents consisted of 2,995 Euro-Americans, 248 African-Americans, 169 U.S.-born Latinos, 44 foreign-born Latinos, and 57 Asians. Logit regression, a measure of the correlation of binary responses, was used to test ethnic variation in NEP scores. Gender, age, education, family size, urban residence, and political orientation were held constant and regression analysis showed that Asians, Euro-Americans and U.S.-born Latinos were similar in their environmental concern, but the environmental concern expressed by African-Americans and foreign-born Latinos was statistically significantly lower than that of the other ethnicities.

Other studies have assessed cultural views of the human/environment relationship within the United States but have not used the NEP as a measure. A study of 532 people in economically disadvantaged and predominantly African-American neighborhoods in Detroit, Michigan assessed whether, as a sub-culture, African-Americans were less environmentally concerned than Euro-Americans sampled, and whether African-Americans perceived more barriers to environmental action than did Euro-Americans (Parker & McDonough, 1999). Lower income areas were over-sampled by 50% in order to achieve a representative sample of African-Americans; the overall response rate was 52%. The NEP was used to measure environmental values and the Environmental Issue Scale to assess specific environmental concerns.

Overall, there was not a statistically significant difference between Euro-Americans and African-Americans on either scale, although there were significant differences on individual items. African-Americans were significantly more concerned about air pollution, noise pollution, litter, water supply, and endangered wildlife. Euro-Americans had a significantly higher mean concern score for overpopulation. Although not statistically significant, African-Americans showed an overall greater level of environmental concern on the Environmental Issue Scale than did Euro-Americans (Parker & McDonough, 1999). I speculate that this may be due to the fact that African American communities are often spatially located near heavy industries and/or manufacturing (Bullard, Mohai, Saha, & Wright, 2007; Fransson & Garling, 1999; United Church of Christ Commission for Racial Justice, 1987) which degrade the immediate environment in which they live: water, air, vegetation, and its associated fauna, such as birds.

A study examined how lower, middle, and upper middle class African-American heads of households residing in six areas of Florida defined the word "environment" (Harper & Brown, 2003). Qualitative data were derived from 32 "elite" and 20 individual interviews and quantitative data were derived from 262 household mail surveys. The study found a difference in definition of the environment among African-Americans depending on economic status: the higher the income the closer the definition of environment came to the word "nature" whereas in lower income groups, environment encompassed all surroundings including people, trash, pollutants, and chemicals.

African-Americans are reported to have negative impressions of wildlands. Johnson and colleagues (Johnson, Horan, & Pepper, 1997) conducted a study of six counties surrounding the Apalachicola National Forest in Florida to determine whether African-Americans residing in rural areas were more favorably disposed to wildlands than African-Americans residing in urban areas. This study found that, regardless of residence, African-Americans regarded wildlands more negatively than do Euro-Americans (Johnson, et al., 1997). Answers to open-ended questions asked by the researchers suggest that the negative connotations of wildlands relates to concerns about safety in those areas. The results in the studies above suggest that people within America may view concepts about the human/environment differently within ethnic groupings and/or socio-economic groupings. Although the actual conception of the relationship was not articulated as part of the studies, it appears to be finely nuanced.

3.4.2 Some International Comparisons of the Human/Environment Relationship

Building on research that identified values common to all nationalities, ethnicities and religions (Schwartz, 1992; Schwartz & Bardi, 2001), some researchers have examined how these universal values inter-relate with values of the environment. Studies suggest that people who hold higher values of the environment also have significantly higher values of benevolence, universalism, altruism and self-direction, and significantly lower values of power (Clump, et al., 2002; Hunecke, et al., 2001). Another study examined values as defined by Schwartz and compared them to environmental values in western countries (the U.S. and the Netherlands) and non-Western nations (Japan; Bangkok, Thailand; and Manila, The Philippines). The authors concluded that, in the

Netherlands and the U.S., environmental values are linked with altruistic values, which are viewed as being contrary to traditional values. In Japan, Bangkok and Manila, environmental values are linked with both traditional and altruistic values. Environmental values were negatively correlated to egoistic and progressive values⁴ in all countries (Aoyagi-Usui, Vinken, & Kuribayashi, 2003).

The fact that universal values have been found among differing cultures of the world suggests that these values may have positive influences on social adaptation (e.g., Dawkins, 1989). Universal values of altruism, benevolence and self-transcendence are positively correlated with pro-environmental concerns and power and self-enhancement values are negatively correlated (Clump, et al., 2002; Hunecke, et al., 2001). This suggests a potential path to encouragement of pro-environmental behaviors by encouraging altruistic and benevolence values through social means. These studies lend to an understanding of the interrelationship among universal values, including traditional values and their relationship to values of the environment. These studies are also important illustrations of the complex mosaic of values that relate to the human/environment relationship existing not just in the United States, but across the world.

A few studies have explored the extent to which countries, that are western European or closely associated with western Europe, endorse the WISP. Those studies suggest that the majority of people living in these countries have high values of the

⁴ This study did not define what was meant by progressive values well. The researchers indicate that progressive values suggest a preference for progress as opposed to a preference for the environment.

WISP, but the highest values of the WISP are expressed in the United States. The scores of the countries on each individual factor of the WISP (the items were measured on a 5 point Likert scale) were: United States (technology, 4.71, political 3.26, and economy 4.05); Denmark (tech 4.66, pol 3.74, econ 3.46); England (tech 4.65, pol 3.30, econ 3.69); and Austria (tech 4.35, pol 3.25, econ 3.80). Of Western European countries, The Netherlands (tech 4.53, pol 3.37, econ 3.45), Spain (tech 4.45, pol 2.67, econ 2.68) and Australia (tech 4.32, pol 3.24, econ 4.08) rank lower in endorsement of the WISP (Kilbourne, et al., (2002). One researcher explains these findings, with respect to Spain, by suggesting that Spain was part of a Mediterranean Basin culture until it joined the European Union and began to adopt the predominant values of western Europeans (Lomas, Alvarez, Rodriguez, & Montes, 2008). Within western industrialized societies, those who have low scores on endorsement of the WISP are significantly less materialistic and show significantly higher levels of environmental concern and behaviors (Kilbourne et al., 2002; Kilbourne & Pickett, 2008).

3.4.2.1 *Mexico*

Most research studies using the NEP in the United States suggest that study participants consider the NEP and WISP/HEP to be dichotomous (Dunlap & Van Liere, 1978, 1984; Dunlap, et al., 2000). Research in Mexico suggests that all nations may not share the conceptualization of the NEP and HEP as dichotomous. Based on a questionnaire administered to citizens of Mexico, Corral-Verdugo and Aremendariz (2000) posed the question whether the New Environmental Paradigm (NEP) and the Human Exceptional Paradigm (HEP) are necessarily dichotomous. They administered the

questionnaire to 412 citizens of Hermosillo, Mexico who were entering a mall. The results showed that the participants ranked NEP factors as more important than those related to the HEP. However, when statistical analysis was run on the factors of the NEP and HEP, there was not a negative relationship, indicating that the participants did not see the paradigms as dichotomous (Corral-Verdugo & Aremendariz, 2000). This, once again, suggests a different view of the relationship of humans to the environment than simply a humans dominating nature or nature endangered by humans dichotomy.

3.4.2.2 *Japan*

In some non-European countries, collectivism is considered to be a traditional value. Individualistic and collectivistic values also tend to impact values of the environment, with studies suggesting that those living in collectivistic societies generally express higher values of the environment than those living in individualistic societies (Aoyagi-Usui, et al., 2003). However, in some circumstances, collectivist values can interfere with environmental values. One example is the mercury poisoning that occurred in Minamata, Japan. The Chisso Corporation, as part of its manufacturing process, emitted mercury into a stream flowing into Minamata Bay. The mercury found its way into the fish eaten by Minamata residents. When people who became ill from mercury poisoning attempted to gain compensation from the Chisso Corporation, they were shunned by those in the community who were not ill. The corporation employed people living in the community and was, therefore, considered to be a part of the community. Seeking compensation was viewed as an attack on the company as a community member and as potentially endangering the jobs of others in the community (Yukiko, Shigeru,

Midori, Tazusa, Shinichi, & Hoffman, 2006). This serves as an example that traditional values may not always correspond positively to environmental values, as suggested by some researchers. In this instance, human/environment relationship was heavily influenced by social paradigm, but traditional values reduced values of the environment.

3.4.2.3 *China*

Although Chinese philosophical traditions emphasize principles of sustainability and reverence for nature, much environmental degradation occurred in China during the Mao era. As an example, 310,000 hectares of wetland were converted to farmlands in pursuit of Maoist dicta that “man must conquer nature” (Yu, Wei, Mingming, Guojun, Bertrand, Child & Shapiro, 2006). Although, in some areas, China is placing a greater emphasis on protecting the environment, the policy is not widely applied or accepted. An example of the complex relationship between values of protection and exploitation of the environment in China lies in the story of the Sanjiang Plain. The Sanjiang Plain is a floodplain located in the far northeast of China on the border with Russia at the confluence of three rivers, the Songhua, Heilong (Amur), and Wusuli (Ussuri) Rivers. In the early 1950s, it was a remote, heavily-forested swamp with abundant birds, fish, foxes, Siberian tigers, wild pigs and black bears, on which the limited human population was able to easily feed itself. Despite the fact that the soils of the region are poor because there is only a thin layer of black soil atop saline soil, land reclamation was promoted by the communist government starting in the 1950s and continuing to the late 1990s. People were encouraged to immigrate there to farm (Yu, et al., 2006).

Today, only 1.9 million hectares (less than 30%) of the original wetlands remain and many native species, including the Siberian tiger, are endangered or extinct. In the 1990s, the area experienced severe flooding, emphasizing the role of wetlands in flood control. The flood events coupled with outside pressure and funding from environmental groups motivated the Chinese government to sign the Ramsar Convention on Wetlands designating several areas in the floodplain as reserves. Local governments announced that no more land in the Sanjiang Plain would be converted to farmland and that some of the farmland would be converted back to wetland (Yu, et al., 2006). The varying perspectives of people living in the region about designation of some areas as reserves are instructive. In general, those who lived in the area before land reclamation and promotion of farming, remember the abundance of fish and wildlife; these residents support more protection of the floodplain. People who work on the reserve also support protection of the area. Those who immigrated to the area to farm, or to provide services to those who farm, do not generally support protection and complain that their means of livelihood is being taken from them. All of these groups have experienced reduced food security because hunting and fishing within the reserve is now prohibited (Yu, et al., 2006).

The relationship of the people living in the Sanjiang Plain is an illustration again of the complex relationships between humans and their environment, and the perceptions and feedbacks between the two that lead to values of the environment. In China, those who lived in the plain prior to the paradigm shift in the region to use of the land for

farming have greater value of the plain than those who came to the plain with the idea of modifying it to meet human needs.

3.4.3 *Traditional or Indigenous Views of the Human/Environment Relationship*

“Traditional” societies, defined as those whose members have lived in a given geographical area for an extended period of time and who gather much of their own food and resources from the land on which they live, include those that exist in remote areas of Alaska (Gladden, 1999) and Canada (Ford, Smit, & Wandel, 2006; Gladden, 1999), in India (Bauer, 2006; Bhagwat, Kushalappa, Williams, & Brown, 2005; Waghchaure, Tetali, Gunale, Antia, & Birdi, 2006), Australia (Strang, 2005), and Africa (Morphy, 1998 [1993]; Onkuwa, 2005) among others. People living in traditional societies demonstrate a completely different perception of the relationship between humans and their environment compared to the values included in the WISP. One common difference is that they incorporate myth and ritual into their social institutions and these myths and rituals serve the purpose of protecting the physical environment.

3.4.3.1 *India, Bali, Ethiopia, and New Guinea*

In India, research of groves considered to be sacred by communities has shown that these areas are particularly rich in biodiversity or other ecosystem services that are essential for survival of the community (see, e.g., Bhagwat, et al., 2005; Gadgil, Hemam, & Reddy, 1998; Waghchaure, et al., 2006). This pattern of using social institutions to protect essential areas or essential processes has been noted in other communities. In Bali, water temples are used to manage water flow and irrigation, tying regulation of water into the religious structure of the communities (Morphy, 1993 [1998]). This has

uncoupled the use of water from often unpredictable political systems. In Ethiopian Nuer pastoral communities, the number of people comprising a community, or a subset of a community, and the places people live change at different times of the year in response to flood and drought cycles, linking people, their cows (a main source of food) and the water cycle of the environment (Morphy, 1993 [1998]). In the Simbai Valley in the highlands of Papua, New Guinea, slaughter of pigs (not a main source of food) happens on about a ten-year cycle that links to other communities' slaughter, and excess destruction of taro crops when the pig population becomes too large (Morphy, 1993 [1998]). For a review of literature that reports use of ritual, myth, story-telling and tradition in protection of ecosystems, see Berkes, Colding and Folke (2000).

3.4.3.2 *Australia: Indigenous and Pastoral*

Strang (2005) compared the place-based knowledge and environmental values of indigenous people to those of colonizing Australians in the Marshall River watershed. This is a savannah ecosystem with thin grasses, and because of the carrying capacity of the land, some of the homesteads of those who moved there as colonizers are 3000 square miles in area, so they are widely separated.

The indigenous population in this area maintained a sustainable relationship with the land for many thousands of years, according to the archaeological record (Strang, 2005). Their relationship to the physical environment is similar to the relationships described above for residents of Bali, Ethiopia and New Guinea. The land is owned collectively by clans, and individuals identify themselves by clan membership and with the land owned by their clan. Spirit children, are connected with a particular part of the

land and are also considered to be ancestors of humans. When a woman is pregnant, a spirit child emerges from the water and enlivens the fetus. A sign is received, and at birth, the child is named according to the clan and spirit. The spirit will also have a totemic identification with an animal, plant or natural element (wind, clouds, etc.) to which the person is linked throughout life. The home place of the child is considered to be the place from which his or her spirit emerged and they will retain that home place throughout life. At death, the spirit that enlivened the person is ritually sent back to its home, establishing a cycle of birth and renewal between humans, their ancestors and their environment (Strang, 2005).

Due to the remote nature of the Marshall River area, it was not colonized until the late 1880s when a gold rush occurred. The pastoralists moved there only a little over a century ago. They see their relationship to the land as largely adversarial, and recount the struggle and amount of effort to maintain “a domestic oasis of greenery and civilization at their homestead” (p. 37) as well as a desire for technological control and dominance over the land and anxiety that nature will destroy their efforts through floods or droughts, or will refuse to be productive. Although this view has softened over time, nature is still seen as an adversary; wilderness needs to be dominated and the reason for being in the Marshall River area is “for the economics of it” (Strang, 2005, p. 40). This comparison is an excellent illustration of differing social paradigms and the effect of the paradigm on perception of, use of, and relationship to the biophysical environment.

3.4.3.3 *Alaska and Canada: Indigenous Peoples*

In studies of the indigenous populations of Alaska and Canada, researchers describe relationships in which the people living on the land recount intimate, and accurate, knowledge of the interrelationships among temperature, winds, sea ice, and migration patterns of birds, fish, and animals among other things (Ford, et al., 2006; Gladden, 1999; Palsson, 1998). People living in these regions are more collectivistic, as their survival often depends on sharing resources with each other (Ford, et al., 2006). Although there is some dispute about the past conservation patterns of communities, currently at least two communities in subarctic Canada who are allowed to manage their resources without government intervention are doing so successfully and they incorporate ritual, myth and story-telling to effectuate sustainable harvest practices (Berkes, 1998). This is accomplished through stories about animals making themselves available to be eaten only when hunters show appropriate respect. Respect includes not taking more than can be used by a community (Berkes, 1998).

Chapter 4 DISCUSSION

4.1 Hypothesis One

The dominant social paradigm will reduce environmental concern when WISP is strong, or increase environmental concern when WISP is weak.

Analysis of the GSS and Kilbourne databases to determine whether the values promoted by the dominant social paradigm mediated the link between environmental concern and environmental behaviors supported hypothesis one, that social paradigm partially, but not fully, mediates the relationship between WISP and environmental behaviors. These results support the thesis that our social paradigm negatively affects our accurate perception of feedback from and information about the biophysical environment, in turn reducing our willingness to undertake action that will increase our adaptive capacity.

The most probable explanation for partial mediation is based on self-perception theory. Self-perception theory (Bem, 1972) posits that, contrary to the assumption most people make that behaviors are derived from attitudes, attitudes are often construed from behaviors or from other external cues when the relevant attitude is not well-defined; that is, when internal cues are weak or ambiguous. Strong attitudes have been defined as persistent over time and resistant to change. Strong attitudes influence information processing and action. Studies have shown that strong attitudes are more predictive of behavior than weak ones (Albarracin, & McNatt, 2005; Chaiken, & Baldwin, 1981; Holland, Verplanken, & van Knippenberg, 2002). Researchers define strong attitudes based on attitude certainty, importance, accessibility, centrality and lack of ambivalence,

among others. The measure of strong attitudes mirrors that of values (Chaiken, & Baldwin, 1981; Holland, et al., 2002). If an attitude is easily retrieved from memory, that is, if it is one that is based on core values, there is no need to construct an attitude by inferring it from behavior or other external cues.

However, when attitudes are weak or ambiguous, “self-perception literature has been strikingly successful in demonstrating that subjects’ attitude inferences can be strongly influenced by external cues” and that prior attitudes are often not used as reference points (Chaiken & Baldwin, 1981, p.2). In situations where people do not have fixed or core values toward an attitude object, attitudes are determined by external cues, context, and past behaviors (Albarracin, & McNatt, 2005; Chaiken, & Baldwin, 1981; Cornelissen, Pandelaere, Warlop, & Dewitte, n.d.; Dillard, 1990; Fried, & Aronson, 1995; Holland, et al. 2002; Knussen, Yule, MacKenzie, & Wells, 2004; Olson, & Stone, 2005).

In the GSS database, 97% of study participants who responded to the questions used to assess environmental concern were above the mid-point measurement of environmental concern, yet 56% of respondents also expressed high WISP values. The differences in the Kilbourne database were even more striking. Ninety-three percent (93%) of participants expressed environmental concern above the mid-point, but 87.8% of participants also expressed WISP values above the mid-point. This suggests a significant disconnect in understanding how our collective behaviors, as motivated by the WISP, affect the environment. If the environment is not a core value for participants, they will derive their attitudes about the environment from external, rather than internal, cues.

These external cues may include the messages promoted by the WISP, such as the message that the recession is caused by our failure to spend enough, the message that a growing economy is necessary to our prosperity, and the message that regulation by government is costly and inhibits the growth of businesses, on which we depend for jobs.

Although not tested in this study, it is likely that our social paradigm interferes with environmental values becoming core values for the majority of people in the United States. As discussed above, universal values of altruism, benevolence and self-transcendence are positively correlated with pro-environmental concerns and power and self-enhancement values are negatively correlated (Clump, et al., 2002; Hunecke, et al., 2001). In studies, the United States scores very high on power and self-enhancement values and low on altruism, benevolence and self-transcendence values compared to other countries (Schwartz, 1992; Schwartz, & Bardi, 2001). With the exception of President Obama's recent call to Americans for a year of service, our social paradigm does not often promote the values of altruism, benevolence or self-transcendence. It seems intuitive that messages about the value of increased consumption and of economic growth keep people's focus on satisfying their material desires and on keeping up with the Joneses. These messages are inherently contradictory to those of environmental protection because all items that we consume must be taken from the environment, and when we are finished with those items, they are then discarded back into the environment. Our biophysical environment is essential for providing the ecosystem services on which we all depend for our survival. It would seem logical that high values of these life-support systems would be a good adaptive strategy, yet combining the

findings of socialization theory, the results of this study and self-perception theory would suggest that our social paradigm interferes with adoption of the environment as a core value.

I would speculate that another reason for the lack of correspondence between environmental concern and environmental behaviors in the United States is our separation, both physically and mentally, from the biophysical environment on which we depend. This has been fostered by technology, just by virtue of the fact that many technological innovations, for example, water treatment systems, remove us from having direct contact with the resources we use. Other technologies distance us because few of us make our own fabric for clothes, or grow or slaughter our food. We do not need to consider the environmental consequences of these actions or the effort involved in producing these items. Additionally, garbage collection and sewage systems have made our wastes invisible to us. Our expanding encroachment/confiscation of habitat poses the problem that, as human-dominated habitat grows, we become less and less aware that other habitats once existed in our geographical space. All of these things numb us to changes that may impact our ability to survive.

Since this study suggests that our social paradigm reduces our environmental concern, it seems likely that our social paradigm has mentally separated us from the environment and our technologies act as the physical embodiment of our mental beliefs by physically separating us from our environment. Many people give no thought to where materials from which our clothes are made come, and the vast majority of people are probably happy to be removed from meat processing. I would argue that the items on

which we rely for survival: clothing, food and water have become commodities to us. The quality and location of our water and food is hidden to the majority of people. Many people do not bother to determine the source. These issues are only brought to our attention when the “experts” who are responsible for these systems fail and a crisis, such as salmonella contamination, occurs and many people become sick or die. Even in the face of a looming water crisis, most people are unaware, largely because technology has removed us from interaction with these resources.

4.2 Hypothesis Two

Living in more highly built environments will correlate positively with pro-environmental values and the western industrialized social paradigm.

Hypothesis two was partially supported by the evidence. Contrary to prior research that suggested that people living in urban areas were more environmentally concerned than those living in rural areas, the data from the 2000 GSS suggest that people living in less populated areas are, in general, significantly more environmentally concerned than those living in more populated areas. Examination of the expected and actual counts for low and high environmental concern of those people dwelling in open country, in small towns of up to 2,500 residents and in towns from 2,500 to 9,999 residents, suggest that environmental concern overall was significantly higher in these areas than for those living in cities of larger size. Some researchers (Duroy, 2005; Fransson & Garling, 1999; Hines, et al., 1987) have suggested that the increase in environmental concern among rural dwellers has resulted from migration of people, with their accompanying environmental values, from big cities to rural areas. Perhaps the

inter-mixing of urban and rural dwellers has reached a point where values have reversed for areas of lower and higher population. Thus, the hypothesis that those living in places with more built environment would express higher levels of environmental concern was not supported by the analysis.

The two relatively clear patterns of the relationship between WISP values and built environment are that those living in medium-sized cities (50,000 to 250,000) tend to have higher WISP values and that those living in open country have significantly lower WISP values than people living in other areas. This partially supports the hypothesis that those living in more built environments would have higher values of the WISP, since people living in mid-sized cities (from 50,000 to 250,000 in population) do have higher values of the WISP compared to almost every other population size. Perhaps people living in open country have lower values of the WISP because of a sense of self-reliance and a feeling that they do things their own way. This may contribute to the significantly lower values of the WISP.

The results of the spatial analysis of the relationship between WISP values and environmental concern with size of population has unexpected results. It would be valuable to be able to compare length of residence at the time of the interview so that the hypothesis that people with urban values are moving to rural areas and taking their values with them could be assessed, but this information was not available in the GSS database. Actual geographic location of the study participants would also be helpful so that built environment could be assessed, as well as specific circumstances relating to that population, including pollution levels, rather than using population as a proxy for built

environment. Additionally, the incremental differences in population in the GSS database become quite large as population increases. Being able to assess smaller increments in population size might provide better information about these relationships. Additional research needs to be completed to more fully explore the reasons for the differences among populations in WISP values and in environmental concern.

4.3 Hypothesis Three

The western industrial social paradigm is not expressed at equal levels or in a conceptually coherent manner across different cultures within the United States or internationally.

The studies and literature analyzed in support of this hypothesis suggest that examination of the human/environment relationship on a local or regional scale is imperative if an understanding of the perception of the human/environment relationship, uses of the biophysical environment, and the underlying causes of environmental decline is to be developed. The studies and literature examined convey that complex relationships exist on local scales and that imposing a larger scale will not convey an accurate representation of these relationships. The relationship between humans and their biophysical environment is formed by a complex pattern of interactions of the biophysical environment, social paradigm, environmental concern, attitudes, values, and behaviors. In essence, it is a complex system and can contribute to or denigrate the resilience of the group adopting the pattern of interactions.

Within the United States, studies have found a difference between Latinos and non-Latinos in Florida in their conception of the NEP (Floyd & Noe, 1993). Cronbach

alpha measures of the NEP for African Americans have been lower than for Euro-Americans, suggesting that these groups view this construct somewhat differently (Parker & McDonough, 1999). In a study conducted across the United States, African-Americans and foreign-born Latinos reported significantly lower environmental values compared to U.S.-born Latinos, Euro-Americans, and Asians (Johnson, et al., 2004). In contrast, African American residents of Michigan did not significantly differ from Euro-American residents of Michigan in overall concern about the environment, but the two groups did differ significantly in their concern about specific environmental issues (Parker & McDonough, 1999). Two Florida studies also suggested that African-Americans as a group differ in their definition of environment and the difference is correlated with socio-economic class (Harper & Brown, 2003), and that African-Americans have a negative association with the word wildlands (Johnson, et al., 1997).

This illustrates that, even in the United States, complex interactions create a mosaic of environmental concern at a local or even finer scale. Ethnicity appears to be at least loosely linked to environmental concern, and people of varying ethnicities are clumped, not dispersed evenly across the United States (US Census, 2000; USDA, 2000). Aggregating scores on measures of environmental concern masks inter-group differences such as those explained by demographic factors like socio-economic class (Taylor, 1989). Studies that lump all respondents together mask interracial differences of opinion regarding the environment and values to protect it, supporting an argument that micro level focus is important, and this can only be done by reporting the ethnic make up, the geographic location and important economic and environmental factors (such as reliance

on hunting and gathering) that will impact environmental values and concerns of the study participants. This is particularly important when the relevant scale of environmental issues is local, so that appropriate opinions regarding the environment are considered when policy is set, decisions are made or education is planned.

There has been much speculation, and some testing with African-American respondents, about the reasons for the ethnic differences between environmental concern and behaviors. Reasons given for lower environmental concern include that ethnic minorities spend more time worrying about more immediate issues such as providing for food, shelter, and security which takes precedence over environmental concerns (Fransson & Garling, 1999). Wildlands may have a more negative meaning (Johnson et al., 1997) because they are perceived to be less safe by African-Americans. Finally, another study speculates that African-Americans do not devote time to environmental behaviors because they do not feel empowered to do so (Parker & McDonough, 1999). These studies are not conclusive, nor exhaustive, and provide only partial explanations for differences.

In Australia and China, different groups of people who live in the same environment perceive the environment much differently. In Australia, indigenous people have close ties to the land and consider themselves to be an integral part of the physical environment, compared to the pastoralists who moved there to conquer and dominate nature and to make it economically productive. This suggests that social paradigm is an important factor in the different environmental values of these groups. In China, values of maintaining the Sanjiang Plain as a reserve differ depending on how the plain was

experienced by those living there. The most interesting observation is that those who lived on the plain when most people gathered their food, thereby living within the biophysical limits of the plain (rather than trying to modify the plain to produce food) expressed values of maintaining and restoring the plain and remembered that the environment provided for them amply. These were people who lived in the area before significant degradation occurred. They, and those who work in the reserve, support protection of the reserve probably because they hope to restore the productivity of the area and because they have developed a sense of place and affection for the reserve. Those who came to the reserve for the purpose of reclaiming the land for farming do not support its protection. Few of them probably experienced the reserve when it was able to sustain the human population and they have developed an adversarial relationship with the land similar to the pastoralists in Australia because they view it as something that must be conquered and made to be productive through great effort. They may have developed an emotional connection to the reserve as reclaimed farmland and resent the threat that their way of life and financial security may be taken from them.

As Strang (2005, p. 28) says in describing the results of her research, “societal beliefs and values are instrumental in creating diverse human-environment relationships.” The studies of indigenous peoples illustrate the interconnectedness between people, their social institutions which are used to create links to their biophysical environment, and the biophysical environment. The most strikingly different perception arising out of these relationships is the depth of interconnectedness between people living in traditional and indigenous communities and their physical environment (Kendrick, 2003; Palsson, 1998).

One author more aptly described the relationship as conflation (Strang, 2005). One result of interconnectedness is that these communities consider themselves to be part of “nature” and do not express values of the domination of, or separation from, nature (see, e.g., Ford, et al., 2006; Gladden, 1999; Kendrick, 2003; Strang, 2005).

I would argue that, when influenced by the WISP, the human/environment relationship may transform from one in which people are closely connected to the land and have an emotional attachment to it, to one in which the connections are severed. For those who colonize an area, the connection to land appears to be severed both emotionally and physically by removal from an area to which they may have formed a bond and transplantation to an unknown environment. The land is then seen as an adversary, either something from which one must fight to obtain economic gain, and/or fight to provide the type of environment wished by the colonizer (perhaps similar to the environment to which the colonizer had a bond). I would further argue that when the physical and emotional bonds are severed so thoroughly that people have little contact with environments that have not been substantially altered by humans, an abstract or symbolic emotional bond to natural environments appears to form, as evidenced by the historically higher environmental concerns and values of urban dwellers (Duroy, 2005; Fransson & Garling, 1999; Hines, et al., 1987).

4.4 Implications For Resilience

One other pattern emerges from examination of the relationship of people who rely on the land for hunting and gathering compared to more developed or industrialized societies. The links among people, their social institutions, and the physical environment

are complex, diverse and redundant in these communities. Additionally, people living in these communities appear to use social institutions to enhance and increase these links and to manage their behaviors in relation to the ecosystem (Berkes, et al., 2000). One excellent example of this was described in the story of caribou hunting in one of the resource-dependent communities in Canada (Berkes, 1998). Caribou had been absent from the community for over a decade. When the caribou returned, they migrated close to a road and were easily accessible. The local people harvested more caribou than they needed. The following year, the caribou did not return to this area in great numbers. The elders of the community explained to the people that, because they had disrespected the caribou by taking more than was needed, the caribou were punishing them by not offering themselves to be eaten.

In this example, a social institution was used to remind people of the link between humans and caribou and the results of overuse of the caribou. This illustrates an understanding of the role of humans in the complex socio-economic system. It also illustrates use of social institutions to mitigate the impact of humans on the environment. The interactions appear to be understood as a complex system, with the need to manage human actions as they impact on the environment, rather than managing the environment to meet human needs, which occurs in communities that express high values of the WISP. Additionally, in more industrialized societies, these links do not seem to be overtly recognized, since we view ourselves as being separate from nature, nor is establishment of links encouraged.

I would speculate that these effects on the values people form and on what knowledge they attend to have implications for resilience of the social-ecological system. Those who highly endorse the WISP value the environment for its ability to provide them with resources for material goods. It teaches us that we are apart from and above the natural world. When we believe that we are separate from the biophysical system, degradation of that system becomes only an abstract concept that is of no concern to us. Without a reminder through seeing or smelling the physical results of our actions each day in removing water and materials and in discarding them as waste, we face a heavy burden of needing to understand the linkages between our behaviors and the biophysical system and research has proven that those understandings do not exist.

I would also argue that in addition to causing a reduction in resilience because humans perceive themselves to be separate from the environment, the WISP may reduce resilience in SESs by impacting the third measure of resilience of SESs; the capacity for learning and adaptation. The WISP breaks the links between environmental feedback and human perception of this feedback in several ways. It socializes us to ignore the impact of our behaviors on the physical environment. It influences us to ignore or discount messages received from and about the biophysical environment. The strong reliance on technology reduces our perception of the state of our resources by distancing us from those resources both physically and mentally (Alessa, Kliskey, & Williams, 2007) as well as by fostering a belief in a technological fix to our environmental problems. Our social institutions encourage economic growth at the expense of natural systems. The research showing a negative correlation between values of the WISP and

values of the environment and ERBs (Kilbourne, et al., 2002) hints at this relationship, but the WISP may interfere with values of the environment by fostering a belief that humans are separate and that we can control and dominate the environment through technology.

I would suggest that the WISP reduces resilience another way through the promotion of unfettered consumption. Consumption is one of the behaviors (the other is overpopulation) that is most directly responsible for destruction and erosion of resilience in natural systems. Increased consumption leads to ever increasing use of fuel, fiber and food, resulting in ever increasing environmental degradation: loss of forests and other habitats from use of wood to make products, or to clear areas for farms or fields for grazing cattle or for development, and increased CO₂ emissions caused by use of fossil fuels to manufacture products and transport them, not to mention increased use of other renewable and non-renewable resources as raw materials in the manufacturing process. The values established by the WISP dictate actions that are contrary to those we must take to increase resilience; attending to the feedback we receive from the environment and reducing consumption. Current reviews illustrate that shifts between states in ecosystems are increasingly a consequence of human actions that cause erosion of resilience in natural systems (Folke, 2006).

Finally, I would speculate that the WISP reduces resilience by encouraging loss of diversity and redundancy in both social and biophysical systems. The WISP fosters maximization of profits by businesses, resulting in an emphasis on the most immediately cost-effective means of producing goods and services. In service of efficiency (and

increased consumption), we create monocultures that grow quickly with a minimum of physical effort (but much use of hydrocarbons), transform more and more land to grow food and fiber, or to mine for fuel and other materials needed in the manufacturing process. Such a short-term focus on efficiency reduces diversity and redundancy, which are viewed as wasteful. Diversity is essential for the ability of CASs, both biophysical and social, in terms of absorbing disturbance and in regenerating and in re-organizing the system following disturbance (Walker & Salt, 2006). If disturbance damages a part of a system, redundancy ensures that other parts of the system will be capable of response. Diversity ensures a wide range of possible responses, which increases ability to successfully re-organize and re-generate following disturbance, particularly when novel or innovative responses are necessary. “A human society may show great ability to cope with change and adapt if analyzed only through the social dimension lens. But such an adaptation may be at the expense of changes in the capacity of ecosystems to sustain adaptation (Smit & Wandel, 2006), and may generate traps and breakpoints in the resilience of a social-ecological system” (Gunderson & Holling, 2002) (p. 260).

In my opinion, the most dangerous idea arising out of the WISP is the perception that we are severed from the biophysical environment. The social messages of the WISP tell us that we are separate and more important than other creatures, and that we are created to dominate nature and make it serve our needs. We believe that a continually growing economy is both necessary and good, despite the fact that we live in a finite system to which no new resources are added. We believe that technology will allow us to use other resources to substitute when those currently in use are depleted. In addition to

all of the social messages we get severing us, we are also physically severed by our technologies. In contrast, those traditional cultures that have existed for millennia enhance the connections between themselves and their biophysical environment rather than severing them. These cultures mimic the redundancy and diversity that exists in biophysical systems and use that redundancy and diversity to increase their resilience. Additionally, they generally seek to maintain their behaviors within the limits of the biophysical system.

It seems logical and defensible to copy both social and biophysical systems that have succeeded over long periods of time. Instead, we seem intent on conducting an experiment that is doomed to fail because it flies in the face of known physical laws by promoting continued growth although we live in a finite system, by increasing vulnerability of the biophysical system by expanding extraction of resources to support increasing consumption in the social system, and by emphasizing efficiency at all costs. Those who advocate the values of the WISP might be accused of belief in alchemy – that we will be able to transmute multiple other compounds to our use when we deplete those that we are currently using.

Although some might argue that at some point in the past the WISP may have contributed to our adaptive capacity and increased our resilience, I would argue that such an argument confounds the ideas behind the WISP and the use of technology. Technologies such as use of fire, invention of agriculture, as just two examples, existed long before the ideas of the WISP became widely accepted. Technology has unarguably increased our adaptive capacity and our resilience. In my opinion technology, although

incorporated into the ideas of the WISP, is separate from the WISP. Adoption of agriculture is different from the idea that we are separate from nature. It is an interesting thought experiment to wonder what our existence on the earth would be like if we had developed technology within the framework that it should work within biophysical limits. The implications of the WISP for the ability of humans to adapt and for their resilience are profound. The mental and physical separation from our biophysical environment that is promoted by the values of the WISP may well be a catastrophic, if not fatal, flaw in our social system.

4.5 Limitations of This Study

There are two primary weaknesses of this study. The first is that only the constructs environmental concern and belief, WISP and environmental behaviors were used to assess impact on environmental behaviors. There are many other factors that research has shown to impact environmental behaviors, including the factors used in both the Theory of Planned Behavior and in Value-Belief-Norm theory. Research by Triandis (1977, 1980) has also suggested that habit may be an important factor in predicting environmental behaviors. These factors were not included in this study and would increase the amount of variance explained in predicting environmental behaviors. However, there were limitations placed on this study by the databases used. Additionally, I wanted to specifically examine the role of social paradigm.

The other weakness resulted from using an existing database, such as the General Social Survey. The main disadvantage of using an existing database is that the researcher is constrained to the questions that were asked as well as to the existing wording of the

questions. As noted in the method section of this paper, several dimensions of the constructs developed in this database had reliability measures below acceptable levels. Without control over the number of questions asked, or the wording of the questions, these problems could not be corrected. A limited number of questions were also asked in a given year, which limited the number of available variables. This in turn limited the number of variables that could be included and tested in a model of environmentally responsible behaviors. One of the most disappointing results of the limited number of questions asked in this study was the inability to actually test built environments because of a lack of data on location of the study participants.

4.6 Next Steps

Little research has been done utilizing resilience and complexity theories to better understand the paradigms, values and perceptions of people living within a given society, particularly in societies that highly endorse the WISP. Complexity theory allows researchers to examine the interconnections between social and biophysical systems and to identify linkages between the two systems that lead to overall system function or failure. Complexity and resilience theory also allow identification of areas where critical linkages are ignored or not adequately maintained to promote adaptive capacity. Future research should focus on expanding the role of social paradigm, perception and values in the context of emergent behaviors and their interactions with the biophysical environment. Another interesting avenue would be to examine how the role of social paradigm, in combination with physical separation from the natural environment in terms of urban living and technology, combines to influence environmental behaviors. There is

research suggesting that technological separation influences perceptions (Alessa, et al., 2007), but no research has yet been done to examine its affect on behaviors.

Research conducted by Triandis (1977, 1980) has suggested that habit is a significant factor in environmental behaviors. A concept similar but distinct from habit is convenience. Study of the affect on environmental behaviors of convenience, social paradigm and the variables used in both value-belief-norm theory and in the theory of planned behavior may advance our ability to account for the variance in environmental behaviors.

Ultimately, we will only be able to develop resilient socio-ecological systems through the behaviors of individual actors, particularly humans. Without an understanding of the powerful role that paradigm plays in these feedbacks, our management strategies and policies will likely be ineffective in promoting sustainability over long periods of time.

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Appendix A
General Social Survey Questions From Year 2000 Used in Analysis

Hypothesis 1

Spatial Questions

N.O.R.C. size code of city of participant's residence. [XNORCSIZ]

Hypotheses 1 and 2

Western Industrial Social Paradigm

Economy.

We worry too much about the future of the environment and not enough about prices and jobs today. [GRNECON] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

People worry too much about human progress harming the environment. [GRNPROG] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Political.

Government should let ordinary people 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 ordinary people protect the environment, even if it interferes with people's right to make their own decisions. [PUBDECID] Government should let ordinary people decide, government should pass laws, can't choose, no answer, not applicable

Which of the following is closest to your view? Government should let businesses 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 businesses protect the environment, even if it interferes with business's right to make their own decisions. [BUSDECID] Government should let businesses decide, government should pass laws, can't choose, no answer, not applicable

Technology.

Modern science will solve our environmental problems with little change to our way of life. [SCIGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Environmental Concern and/or Beliefs

In general, do you think that air pollution caused by industry is . . . for the environment? [INDUSGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

In general, do you think that air pollution caused by cars is . . . for the environment? [CARSGEN] Extremely dangerous for the environment, very dangerous,

somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

And, do you think that air pollution caused by cars is . . . for your family?

[CARSFAM] Extremely dangerous for you and your family, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for you or your family, can't choose, no answer, not applicable

In general, do you think that pesticides and chemicals used in farming are . . . for the environment? [CHEMGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

In general, do you think that pollution of America's rivers, lakes and streams is . . . dangerous for the environment? [WATERGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

In general, do you think that a rise in the world's temperature caused by the 'greenhouse effect' is . . . dangerous for the environment? [TEMPGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

There are more important things to do in life than protect the environment. [IMPGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

The earth cannot continue to support population growth at its present rate. [POPGRWTH] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Environmental Behaviors

Intentions.

How willing would you be to pay much higher prices in order to protect the environment? [GRNPRICE] Very willing, fairly willing, neither willing nor unwilling, not very willing, not at all willing, can't choose, no answer, not applicable

And how willing would you be to pay much higher taxes in order to protect the environment? [GRNTAXES] Very willing, fairly willing, neither willing nor unwilling, not very willing, not at all willing, can't choose, no answer, not applicable

And how willing would you be to accept cuts in your standard of living in order to protect the environment? [GRNSOL] Very willing, fairly willing, neither willing nor unwilling, not very willing, not at all willing, can't choose, no answer, not applicable

Actual behaviors.

Are you a member of any group whose main aim is to preserve or protect the environment? [GRNGROUP] Yes, no, don't know, no answer, not applicable.

In the past five years, have you signed a petition about an environmental issue? [GRNSIGN] Yes, I have, No, I have not, don't know, no answer, not applicable

In the past five years, have you given money to an environmental group? [GRNMONEY] Yes, I have; no, I have not; don't know; no answer; not applicable

In the past five years, have you taken part in a protest or demonstration about an environmental issue? [GRNDEMO] Yes, I have; No, I have not; don't know; no answer; not applicable.

Appendix B
Questions from the Kilbourne/Pickett Questionnaire
Used in My Analysis

US Random Sample Questionnaire

Below is a series of statements about various things. Please circle the number that comes closest to expressing your agreement or disagreement with the statement.

Dominant Social Paradigm

		strongly disagree		strongly agree		neutral		strongly
<i>Technology</i>								
Advancing technology provides us with hope for the future	1	2	3	4	5	6	7	
The good effects of technology outweigh its bad effects	1	2	3	4	5	6	7	
Advancing technology is under control	1	2	3	4	5	6	7	

Political

Individual freedom should be the political goal to be achieved in society	1	2	3	4	5	6	7	
Private property should be protected as a fundamental freedom	1	2	3	4	5	6	7	
We should limit the government's role in the choices people make	1	2	3	4	5	6	7	

Economic

Individual behavior should be determined by economic self-interest	1	2	3	4	5	6	7	
The best measure of progress is economic	1	2	3	4	5	6	7	
If the economy continues to grow, everyone benefits	1	2	3	4	5	6	7	

Anthropocentrism

What is best for humans is more important than what is best for nature	1	2	3	4	5	6	7	
------------------------------------------------------------------------	---	---	---	---	---	---	---	--

It is alright for humans to use nature as a resource for economic purposes 1 2 3 4 5 6 7

Nature has value because it is useful for human purposes 1 2 3 4 5 6 7

Competition

It is natural to be competitive 1 2 3 4 5 6 7

Competition is more important for survival in nature than cooperation 1 2 3 4 5 6 7

Competition promotes the good of nature in the end 1 2 3 4 5 6 7

Atomism

All the elements in nature are tied together in a single whole 1 2 3 4 5 6 7

Nature is best understood as a whole, not as separate parts 1 2 3 4 5 6 7

It is the relationship between things that makes them what they are 1 2 3 4 5 6 7

Environmental Concerns and Beliefs

Many types of pollution are rising to dangerous levels 1 2 3 4 5 6 7

Some living things are unnecessarily being threatened with extinction 1 2 3 4 5 6 7

Continued use of chemicals in agriculture will damage the environment 1 2 3 4 5 6 7

Shortages of some important natural resources will occur in the near future 1 2 3 4 5 6 7

Our present rate of consumption can be maintained with no ecological problems 1 2 3 4 5 6 7

Global warming is becoming a problem 1 2 3 4 5 6 7

Ozone depletion is an important environmental problem 1 2 3 4 5 6 7

Destruction of rainforests will have negative environmental consequences 1 2 3 4 5 6 7

The availability of clean water will become a problem in the future 1 2 3 4 5 6 7

Environmental Behaviors

I would contact my political representative about an environmental issue no ____ yes ____

I buy environmentally friendly products whenever possible no ____ yes ____

I reduce household waste whenever possible no ____ yes ____

I use products made from recycled material whenever possible no ____ yes ____

I compost food, grass, and other waste whenever possible no ____ yes ____

I buy organic food whenever possible no ____ yes ____

I am a member of an environmental organization no ____ yes ____

I contribute money to an environmental organization no ____ yes ____

I subscribe to an environmental magazine no ____ yes ____

I am an environmental activist no ____ yes ____

Appendix C
General Social Survey Questions From Year 2000 Assessed For Use

Hypothesis 1

Spatial Questions

Region of interview: New England, middle Atlantic, East North Central, East North Central, South Atlantic, East South Central, West South Central, Mountain and Pacific. [REGION]

N.O.R.C. size code of city of participant's residence. [XNORCSIZ]

Would you describe the place where you live as a big city, the suburbs, a small city or town, a country village, a farm or home in the country, don't know, etc. [COMTYPE]

Hypotheses 1 and 2

Western Industrial Social Paradigm

Economy.

Large differences in income are necessary for America's prosperity.

[INEQUAL5] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Private enterprise is the best way to solve America's economic problems.

[PRIVENT] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

We worry too much about the future of the environment and not enough about prices and jobs today. [GRNECON] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

People worry too much about human progress harming the environment.

[GRNPROG] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

In order to protect the environment, America needs economic growth.

[GRWTHELP] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Economic growth always harms the environment. [GRWTHARM] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Economic progress in the United States will slow down unless we look after the environment better. [ECONGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Please tell me whether you strongly agree, agree, neither agree nor disagree, disagree or strong disagree with the folk statement: In a free society, it is all right if a few people accumulate a lot of wealth and property while others live in poverty.

[WLTHPOV]

Political.

Government should let ordinary people 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 ordinary people protect the environment, even if it interferes with people's right to make their own decisions. [PUBDECID] Government should let ordinary people decide, government should pass laws, can't choose, no answer, not applicable

Which of the following is closest to your view? Government should let businesses 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 businesses protect the environment, even if it interferes with business's right to make their own decisions. [BUSDECID] Government should let businesses decide, government should pass laws, can't choose, no answer, not applicable

Some people think that the government in Washington is trying to do too many things that should be left to individuals and private businesses. Others disagree and think that the government should do even more to solve our country's problems. Still others have opinions somewhere in between. Where would you place yourself on this scale, or haven't you made up your mind on this? [HELPNOT] I strongly agree that the government should do more, unlabeled point between these two answers, I agree with both answers, unlabeled point between these two answers, I strongly agree that the government is doing too much, don't know, no answer, not applicable.

Freedom is having a government that doesn't spy on me or interfere in my life. [NOGOVT] One of the most important things, extremely important, very important, moderately important, somewhat important, not too important, don't know, no answer, not applicable. #828B

Technology.

Overall, modern science does more harm than good. [HARMGOOD] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Modern science will solve our environmental problems with little change to our way of life. [SCIGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Environmental Concern and/or Beliefs

We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems and for each one, I'd like you to tell me whether you think that we are spending too much money, too little money, or about the right amount on improving and protecting the environment? [NATENVI] [reworded at some point for NATENVIY – figure out when.]

We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems and for each one, I'd like you to tell me whether you think that we are spending too much money, too little money, or about the right amount on improving mass transportation? [NATMASS]

Almost everything we do in modern life harms the environment. [HARMSGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

The earth cannot continue to support population growth at its present rate. [POPGRWTH] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

There are more important things to do in life than protect the environment. [IMPGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

It is just too difficult for someone like me to do much about the environment. [TOODIFME] P. 1755 Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

There is no point in doing what I can for the environment unless others do the same. [OTHSSAME] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Many of the claims about environmental threats are exaggerated. [GRNEXAGG] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

Some countries are doing more to protect the world environment than other countries are. In general do you think that America is doing: more than enough, about the right amount, too little, can't choose, no answer. [AMPRPGRN]

In general, do you think that air pollution caused by industry is . . . for the environment? [INDUSGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

In general, do you think that air pollution caused by cars is . . . for the environment? [CARSGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

And, do you think that air pollution caused by cars is . . . for your family? [CARSFAM] Extremely dangerous for you and your family, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for you or your family, can't choose, no answer, not applicable

In general, do you think that pesticides and chemicals used in farming are . . . for the environment? [CHEMGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

In general, do you think that pollution of America's rivers, lakes and streams is . . . dangerous for the environment? [WATERGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

In general, do you think that a rise in the world's temperature caused by the 'greenhouse effect' is . . . dangerous for the environment? [TEMPGEN] Extremely dangerous for the environment, very dangerous, somewhat dangerous, not very

dangerous, not dangerous at all for the environment, can't choose, no answer, not applicable

Environmental Behaviors

Intentions.

How willing would you be to pay much higher prices in order to protect the environment? [GRNPRICE] Very willing, fairly willing, neither willing nor unwilling, not very willing, not at all willing, can't choose, no answer, not applicable

And how willing would you be to pay much higher taxes in order to protect the environment? [GRNTAXES] Very willing, fairly willing, neither willing nor unwilling, not very willing, not at all willing, can't choose, no answer, not applicable

And how willing would you be to accept cuts in your standard of living in order to protect the environment? [GRNSOL] Very willing, fairly willing, neither willing nor unwilling, not very willing, not at all willing, can't choose, no answer, not applicable

Actual behaviors.

How many children do you have? [CHILDS] nominal information

I do what is right for the environment even when it costs more money or takes up more time. [IHLPGRN] Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, can't choose, no answer, not applicable

How often do you make a special effort to sort glass or cans or plastic or papers and so on for recycling? [RECYCLE] always, often, sometimes, never, recycling not available where I live, don't know, no answer, not applicable

Are you a member of any group whose main aim is to preserve or protect the environment? [GRNGROUP] Yes, no, don't know, no answer, not applicable.

In the past five years, have you signed a petition about an environmental issue? [GRNSIGN] Yes, I have, No, I have not, don't know, no answer, not applicable

In the past five years, have you given money to an environmental group? [GRNMONEY] Yes, I have; no, I have not; don't know; no answer; not applicable

In the past five years, have you taken part in a protest or demonstration about an environmental issue? [GRNDEMO] Yes, I have; No, I have not; don't know; no answer; not applicable.