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Ecologically Friendly Food Buying and Recycling: Environmental Attitudes and Behaviors in a Tennessee Survey.

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Ecologically Friendly Food Buying and Recycling:

Environmental Attitudes and Behaviors in a Tennessee Survey

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by

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ABSTRACT

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This thesis focuses on pro-environmental attitudes and behaviors and the interactions between recycling behavior, food buying attitudes, food buying behaviors, and ecological beliefs. Following an introductory chapter, I present an article-length paper on recycling behavior to be submitted to *Environment and Behavior.* Data for this study came from a telephone survey of Tennessee residents (N=270). Using OLS regression analysis, I find that recycling behavior is significantly related to access to recycling facilities. I do not find a significant interaction effect between access to recycling facilities and willingness to recycle. I conclude by suggesting that pro-environmental policies need to make structural resources more available to all in order to promote recycling (and protect the environment in general). Positive attitudes alone do not get us very far. My additional thesis research goal of developing an accurate measure of ecological food buying attitudes and behaviors needs further work.

DEDICATION

I dedicate this thesis to Mr. and Mrs. William Alexander Gates, Sr., “Dee and Paw,” who made my education possible from the start.

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CHAPTER 1

INTRODUCTION

There are several environmental problems, including deteriorating water quality and soil quality due to farming practices, air pollution due to driving automobiles, environmental damage from mining, and wetland destruction for housing developments, that are tied to American consumption. Many of these problems contribute to the larger problem of global warming, and 40 percent of Americans are not aware of the human impacts on climate change (McCright 2010). This is because we are disconnected from the process of how we get the things we buy and what happens to them after we finish using them (see Leonard 2010). As Ikerd (2006:n.p.) writes, "Increasingly, American consumers want to know where their food comes from, how it is produced, and who produced it," which shows that the American public is becoming increasingly aware of the disconnected process of buying, using, and throwing away consumer goods.

The purpose of this study is to examine individuals' attitudes and behaviors with regard to consumption and waste and the ways that people may apply environmental issues to their own lives. In this thesis consumption will be examined in terms of attitudes and behaviors toward food buying, and waste will be examined in terms of participation in household recycling.

The purpose of this chapter is twofold: (1) to give a detailed overview of the literature, my research questions, and my methods and (2) to provide background for and to introduce the article I am submitting to the peer-reviewed journal *Environment and Behavior* (which follows in Chapter 2).

This thesis analyzes data from a survey of Tennessee residents. Tennessee offers a good location for an environmental study because the population in Tennessee and Tennessee's

environmental policies provide a contrast to more socially progressive states such as California where environmentally-focused research is abundant (e.g. Bradford et al. 2010; Drummond 2010; Sathaye, Harley and Madanat 2010; Shilling 2009; Sze et al. 2009). Additionally, Tennessee is in the Southeastern U.S., a region that tends to be politically conservative (Jones 2009). The Southern U.S. tends to be environmentally conservative as well. Of the people living in the South Central United States, 56 percent do not believe that global warming is happening (Pew 2009). Tennessee also has high rates of poverty and ranks low on health indicators when compared to other states.

Fifteen percent of the Tennessee population lives in poverty, ranking the ninth highest in the U.S. (Trust for America's Health 2010). The median family income for Tennesseans is $49,804, which is the eighth lowest in the country (Trust for America's Health 2010). For health indicators, Tennessee is in the top 10 for high infant mortality rates, low birth weight, high rates of pre-term labor, high obesity rates in children, high rates of adult obesity and diabetes, high hypertension rates and high physical inactivity (Trust for America's Health). Tennessee also has the seventh highest rate of smokers in the United States, with an average of 23 percent of adults smoking cigarettes from 2006 through 2008 (Trust for America's Health 2010). Judging from these public health indicators, Tennessee does not appear to be a progressive state in terms of health and income measures.

Tennessee is also environmentally conservative, shown by the state's high rates of air pollution as compared to other states. In 2009 Tennessee was in the top 12 states for the highest amount of disposal or release of all chemicals (Toxic Release Inventory 2009a). For the

chemical dioxin, Tennessee was in the top 10 for the highest amount of disposal or release of dioxin and dioxin-like compounds (Toxic Release Inventory 2009b).

Tennessee is religiously conservative. As an indicator of conservatism, Tennessee is among the states with the highest population of Baptists and among the states with the lowest percentage of people who identify with "no religion" (Kosmin, Mayer, and Keysar 2001). Because of all the above reasons, Tennessee provides an interesting case study for learning about the extent of pro-environmental attitudes and behaviors that can be found in the Southeastern United States.

Literature

Environmental Attitudes

In this section I discuss the literature on general environmental attitudes and then the literature on specific environmental attitudes. Researchers have studied general environmental attitudes such as ecological worldview in conjunction with values, religion, and demographic characteristics.

In much of the literature on environmental attitudes, a measure called the New Ecological Paradigm (NEP) scale is used to measure environmental attitudes. The NEP scale was created by Dunlap and Van Liere (1978) and subsequently improved upon (Catton and Dunlap 1980; Dunlap 1980; Van Liere and Dunlap 1984). The NEP has been shown to be an accurate and reliable measure of ecological worldview and pro-environmental attitudes and beliefs (Dunlap et al. 2000; Pierce et al. 1987; Stern, Dietz, and Guagnano 1995).

The literature on environmental attitudes reports many demographic correlates. When measured with the NEP scale, females are more likely to hold ecological worldviews than males

(Hirsh and Dolderman 2007; Johnson et al. 2004; Tarrant and Cordell 1997). Other studies offer various reasons why women consistently show stronger ecological worldviews than men, including value differences between men and women. Dietz, Kalof, and Stern (2002) found that there are significant differences in gender on the following categories: helpfulness, loyalty, and protecting the environment. Therefore, gender differences in NEP scores and environmentally conscious food buying behaviors—one of the areas of interest in my research—could be influenced more by differences in how men and women are socialized to value their relationships to others and to the environment, which would then influence the way men and women think about and shop for groceries.

Studies have shown that whites are more likely than blacks and Latinos to profess stronger ecological worldviews (Johnson et al. 2004). However, few studies try to explain the basis for racial or ethnic differences in ecological worldview. The literature also shows a negative correlation between income and NEP scores (Dunlap et al 2000; Tarrant and Cordell 1997), meaning that people with lower incomes tend to identify with an ecological worldview, while those with higher incomes tend to not identify with an ecological worldview. Studies that find this negative correlation do not explain the basis for the direction of the relationship. Conversely, education is often found to be positively related to NEP scores (Dunlap et al 2000; Tarrant and Cordell 1997; Van Liere and Dunlap 1980), meaning that people with low levels of education tend to not identify with an ecological worldview, while people with higher levels of education tend to identify with an ecological worldview. Therefore, as education increases, so does professed ecological worldview.

Age is often negatively related to NEP scores (Johnson et al. 2004; Van Liere and Dunlap 1980), with some exceptions (Tarrant and Cordell 1997). Research also shows that a person's birth cohort can have explanatory power when it comes to environmentalism (Dietz et al. 1998; Kanagy et al. 1994). Examining a birth cohort can be important because groups of people grow up in the same period of time and experience similar circumstances, which can make them see the world in a similar way. For example, if a cohort of people were exposed to a national environmental phenomenon, such as Rachel Carson's book in 1962, *Silent Spring* (a catalyst for the modern environmental movement), then this group might have stronger pro-environmental attitudes than a group of people who were born later. Other demographic characteristics that could possibly be linked to pro-environmental attitudes are urban vs. rural residential patterns. Very few studies look at urban and rural characteristics as a way to explain environmental attitudes or behaviors. A study conducted by Jones, Fly and Cordell (1999) finds that urban and rural characteristics do not help predict a person's environmental attitudes.

Studies have also shown that values and concerns can help predict environmental attitudes. Hirsh and Dolderman (2007) found that altruism and biocentrism are better predictors of environmental concern than egocentrism. Therefore, the values that focus outside the self (altruism and biocentrism) are better predictors of an ecological worldview than values that focus on the self (egocentrism). Similarly, Stern et al. (1999) describe a social-psychological theory of environmentalism that measures the following values: egalitarianism, hierarchy, individualism, and fatalism. Their cultural theory states that egalitarian attitudes are most likely to be correlated with environmentalism, and individualistic attitudes are the least concerned with environmentalism (Stern et al. 1999). These studies both suggest that concern for others is

associated with environmentalism, while concern for self is not associated with environmentalism.

Researchers have also explored how religious values correlate with environmental attitudes. For example, people who report that they are religious fundamentalists have lower NEP scores, meaning that religious fundamentalists are less likely to ascribe to an ecological worldview (Slimak and Dietz 2006). Slimak and Dietz distinguish between religiosity and spirituality by operationalizing spirituality as stressing more holistic rather than traditional views about religion. The more traditional the view, that is, the more respondents interpret religious texts as literal, and the higher the frequency of attending religious services contribute to a person's classification as religiously fundamentalist. If a person considered the religious texts to be "inspired" rather than literal, then Slimak and Dietz (2006:1693) classified the person as "generally religious." Because the beliefs of people who self-identify as religious fundamentalists are different from people who report themselves to be "generally religious" *and* "spiritual," it makes sense to consider people's religious and spiritual worldviews in association with their ecological worldviews. A generally religious person might be more likely to see the world as serving a higher purpose and be willing to over-ride "efficiency, practicality and experience" with his or her religious beliefs (Stern et al. 1999:86). Thus, people who profess to be "spiritual" are more likely to have an ecological worldview, while fundamentally religious people are less likely to have an ecological worldview (Slimak and Dietz 2006). Slimak and Dietz posit that a sense of stewardship may be involved, such that generally religious or spiritual values may include ethics of environmental stewardship that would promote an ecological

worldview. In contrast, people with religiously fundamentalist values may draw on a different ethic that contradicts an ecological worldview (Slimak and Dietz 2006:1701).

Although general attitudes about the consumption of resources are part of the NEP, potential avenues of research involve people's attitudes about specific types of consumption and possible connections to environmentalism. For example, a recent consumer fad involves buying food from local sources and becoming a "locavore." Yet there are no studies that examine general environmental attitudes alongside food-buying attitudes. There are studies of consumers' perceptions of whether food is "local" or not, but that research isn't connected to consumers' environmental attitudes (Hansen 1994). There are some studies about food-buying behavior (Kriege-Steffen et al. 2010; Magkos, Arvaniti, and Zampelas 2006; Nurse, Onozaka, and McFadden 2010; Tarkianinen and Sundqvist 2005), but very few that attempt to tie environmental attitudes into the explanation.

Pro-Environmental Behaviors (PEB)

There are several different types of pro-environmental behaviors (PEBs) ranging from general to specific. Some studies attempt to measure general PEBs such as involvement in the "environmental movement," which can refer to a variety of activities such as giving money to the Sierra Club, enrolling in electronic payment plans for household bills, choosing "green" sources of energy, or biking to work. Some studies only focus on specific behaviors such as biking to work or recycling.

General PEB. Environmental values are helpful in predicting PEB. Hirsh and Dolderman (2007) posit three main categories of environmental values: egocentric, in which a person is concerned about environmental problems due to the environmental degradation affecting himself

or herself; altruistic, in which a person cares for the well-being of others; and biospheric (also referred to as "biocentric"), in which a person values the integrity of nature itself. These environmental values are helpful in predicting PEB (Clark et al. 2003; Hirsh and Dolderman 2007; Stern et al. 1999). Clark et al. state that altruism and biocentrism are necessary values for people whom voluntarily participate in "an environmental public good" such as household recycling (2003:245). Hirsh and Dolderman (2007) found that the values that focus outside the self (altruism and biocentrism) are better predictors of pro-environmental behavior than values that focus on the self (egocentrism). Stern et al. (1999) show that concern for others is associated with PEB, while concern for self is not. Also, sociological studies of structural influences on PEB find stronger associations than studies of altruistic values or social norms.

Some researchers focus their time on suggesting interventions to get people to recycle. The research interventions suggested by researchers include targeting households that have characteristics of those who are less willing to recycle, reuse, or reduce waste and introducing them to programs that encourage recycling, reusing, and reducing waste (Barr et al. 2001). Barr et al. (2001) suggest that to achieve a noticeable increase in PEB, the key households to target should be those with characteristics of non-recyclers and non-reusers, because the people in these households are unlikely to understand, know, or care about "what can be recycled or reused" and how to recycle (Barr et al. 2001:79). These researchers also suggest that policy makers begin to treat recycling, reusing, and reducing waste as separate behaviors because "they have their own individual attributes" (Barr et al. 2001:79). Clark et al. (2003) recommend that when making a model of PEB, one should pay attention to how a person's behavior is constrained by structural and political systems. They argue that a person can behave only in ways that are available to

them. For example, with recycling, Clark et al. (2003) point out that a person cannot participate in a recycling program if no such program is made available. Therefore, in order for this study or any study to have relevance to policy, it is important to gather data on structural and infrastructural factors.

Specific PEB. I examine the literature on two specific PEBs, food-buying and recycling. The literature on food buying in conjunction with environmental attitudes is lacking. There are studies about consumption (e.g. Russell 1997), and there are studies about food consumption, such as farmers coordinating with consumer practices (Martinez and Davis 2002). Also there are studies about general "sustainable" consumption (Thogersen and Olander 2006) and ethical food production (Beagan, Ristovski-Slijepcevic, and Chapman 2010). However, there are very few studies on environmentally friendly food-buying behaviors (Blake, Mellor, and Crane 2010). Rather than focus on what the person buys in the store, or the environmental impact of the food purchase, they focus on the consumer's perception of "local" food (Hansen 1994). These studies also focus on food buying and sustainability in the national context (Chambers et al. 2007; Hansen 1994), or alternative food networks and group purchasing for organic foods (Little, Maye, and Ilbery 2010).

In one interesting study, Linn, Vining, and Feeley (1994) performed a yearlong experiment to determine if educational interventions help people reduce waste through consumption. They targeted consumption as a waste-reduction strategy because people can reduce waste by consuming things that do not create as much waste in the first place (such as by buying bulk goods or goods packaged in recyclable materials). This study found that there was not a significant difference between the waste reduction for the group that received education

and the group that did not receive education. Therefore, education alone might not be enough to get people to buy less wasteful items, which would subsequently reduce their waste. However, this study did not examine the environmental attitudes of the participants.

There are studies about gender differences in grocery shopping. Women do more grocery store shopping than men and therefore might think more about the grocery decisions they make. Goodman (2008) shows that on average each day, 17 percent of women go grocery shopping opposed to only 10 percent of men. Also, Scott and Willits (1994) found females to be significantly more likely to engage in environmentally friendly consumer behavior while males were found more likely to engage in political behavior. Therefore, environmentally friendly consumer attitudes might be more likely to be expressed by women than men and perhaps would be reflected in their food-buying behaviors.

There is also a plethora of literature concerning marketing techniques to get people to consume (e.g. Cope et al. 2010; Foxall et al. 2006). However, none of these studies show the connection between environmental attitudes and food-buying attitudes. Therefore, we lack studies on individual food-buying behavior and its relationship to environmental attitudes. The question raised by this absence is whether or not an ecological food-buying mentality exists. If so, what is it? How do we measure it? What else is it related to?

The other specific pro-environmental behavior I examine is recycling. Social pressure in the form of having friends, family, and neighbors who act environmentally (e.g. recycle) are associated with several pro-environmental behaviors including recycling behavior (Barr et al. 2001; Stern et al. 1999). Barr et al. (2001:79) explain that "recycling is fundamentally norm based" because it is a highly visible behavior -- such as putting large bins at the end of your

driveway. Barr et al. (2001) also say that participation in curbside recycling will lead to positive reactions and intentions of neighbors and other onlookers, thus encouraging them to mirror recycling behavior.

The literature supports the idea that specific pro-environmental behaviors are associated with specific attitudes, behaviors, cultural expectations, and external contexts. For example, Stern et al. (1999:96) find that personal normative beliefs (e.g. "I feel a sense of personal obligation to take action to stop the disposal of toxic substances in the air, water and soil") predict (in a regression model) specific pro-environmental consumer behaviors and willingness to sacrifice (e.g. willing to pay higher taxes), but they do not appear to influence an individual's decision to participate in an environmental activist demonstration. In other words, a universal, pro-environmental attitude does not reliably predict a specific type of PEB; instead, researchers must consider individual PEBs as distinct categories to be understood separately.

The researchers working on the relationship between pro-environmental behaviors and pro-environmental attitudes have suggested that more research be done on the dimensionality of the NEP Scale, how NEP beliefs are organized across different populations and to determine how the NEP Scale results relate to attitudes, beliefs, and behaviors (Dunlap et al. 2000:439). Barr et al. (2001) suggest documenting changes in pro-environmental behaviors and pro-environmental attitudes over time and recommend that a longitudinal study of a population would be the most fruitful research approach (2001:78).

Most of the existing literature speaks generally about the relationships between environmental attitudes and environmental behaviors. Stern et al. (1999) argue that sociologists now need to go further by researching links between *specific* environmental attitudes and *specific*

environmental behaviors. This study heeds that call for researchers to be as specific as possible about researching the causes of PEB and environmental attitudes (Stern et al. 1999:91).

The things we buy such as big houses, cars, and fashionable clothing characterize American affluence. Logically speaking, the more things we buy, the more we have to throw away. Equally indicative of the affluent American lifestyle is the waste we create. Consumption and waste are two areas where people have great potential to apply environmental concerns to their daily lives. If people choose to act environmentally when they buy things, they can simply reduce the amount of things they buy, they can buy items made of environmentally friendly materials, they can (theoretically) choose not to buy anything and make it all themselves, or they can decide to buy locally so their items don't have to travel so far. There are also ways people can act environmentally when they throw things away. They can compost their organic waste, reuse household items so they don't go to a landfill, or recycle.

Because consumption and waste are two pivotal areas where Americans can increase their environmentalism, in this thesis I study the environmental behaviors of pro-environmental food buying and household recycling. This study begins the process of developing a useful scale of pro-environmental food buying behaviors and attitudes. I begin the food-buying scale development by testing a series of questions on food buying and by presenting information about what social characteristics and attitudes are associated with pro-environmental food-buying behaviors. I also examine the social and attitudinal influences on household recycling behaviors. This study goes beyond the basic social and attitudinal characteristics and explores what structural and infrastructural factors can promote these specific pro-environmental behaviors.

Hypotheses

Hypothesis 1. If one thinks about the items that come into his or her house, then one might think about the items that come out of his or her house. This hypothesis states that buying environmentally friendly products (ecologically conscious food buying behavior) will positively relate to environmentally friendly waste management (recycling behavior). I test this hypothesis by running a correlation to see if ecologically conscious food buying behaviors are positively correlated with recycling behavior.

Hypothesis 2. If someone thinks about the ecological consequences of the food he or she buys, then he or she might be influenced to behave in an environmentally friendly way due to pro-environmental beliefs and attitudes. This hypothesis states that buying environmentally friendly products (ecologically conscious food buying behavior) is mediated by general environmental beliefs (NEP) and specific environmental attitudes (ecologically conscious food buying attitudes). To test this hypothesis, I ran a linear regression with environmental beliefs (NEP), food buying attitudes (ECFB-A), and the interaction variable (NEP times ECFB-A) as the independent variables, and food buying behavior (ECFB-B) as the dependent variable.

Hypothesis 3. Recycling behavior will be influenced by the context in which the person recycles. This hypothesis states that environmentally friendly waste management (recycling behavior) is mediated by access to recycling (available curbside or drop-off recycling). To test this hypothesis, I ran a linear regression in which access to drop-off recycling and access to curbside recycling are the independent variables and recycling behavior is the dependent variable, predicting that both drop-off and curbside recycling will explain variation in recycling behavior.

Hypothesis 4. Recycling behavior will also be influenced by the environmental attitudes and recycling attitudes of the individual. This hypothesis states that environmentally friendly waste management (recycling behavior) is mediated by general environmental beliefs (NEP) and specific recycling attitudes (willingness to recycle). To test this hypothesis, I ran a linear regression with environmental beliefs (NEP) and willingness to recycle as the independent variables, and recycling behavior as the dependent variables. This hypothesis states that both NEP and willingness to recycle will be positively correlated with recycling behavior and will be significant predictors in the regression model.

Method

Data Source, Participants, and Sampling Design

The data for this research were collected by telephone survey in March 2009 by volunteer undergraduate and graduate interviewers. I contracted Survey Sampling International[1] to create a random sample of Tennessee residents' home telephone numbers and to screen the sample for non-working numbers. Therefore, the participants for this survey are based on a random sample of Tennessee residents. In my study I am interested in households in the state of Tennessee. Below I explain more about the data collection process.

See Table 1 for the equation SSI used to calculate the number of exchanges needed in the sample. I planned to have a representative sample of Tennessee households, requiring 500

[1] Survey Sampling International (SSI) is a research assistance company for academics, market researchers, and other businesses. SSI specializes in surveys, including telephone, web-based, mail and in-person surveys. For telephone surveys, SSI starts with a working directory of all possible telephone exchanges in the area of interest.

completed surveys. SSI estimates on average about 35 percent of the existing exchanges are in service at any time. SSI also estimates that about 90 percent of the people who answer the telephone will be eligible to participate in the survey, but that only about 25 percent of those who answer the phone will complete the survey. Using this equation, SSI randomly sampled from all of the existing exchanges in Tennessee to obtain 6,349 telephone numbers. Then SSI screened the sample using computer automated calling to eliminate telephone numbers that are disconnected. SSI says that the typical screened sample will eliminate 50 to 60 percent of the non-working numbers. Therefore, the telephone list that I received was 3,978 telephone numbers, which is 63 percent of the 6,349 telephone numbers sampled. SSI's sample only included home telephone lines. Because they did not have access to cellular telephone numbers, the possibility that I obtained a representative sample of all adult Tennessee residents is unlikely.

The only information that came with the telephone numbers was the time zone in which the telephone exchange is located (Eastern or Central Standard Time). There were no names, addresses, or identifying information on the telephone list.

SSI has three options of how to select the telephone sample. I chose the Equal Probability Selection Method in which "every possible telephone number [. . .] in a working block with at least one directory-listed telephone number has an equal probability of selection" (Survey Sampling International). SSI explains the sampling procedure:

> *Most SSI samples are generated using a database of "working blocks." A block (also known as a 100-bank or a bank) is a set of 100 contiguous numbers identified by the first two digits of the last four digits of a telephone number. For example, in the telephone number 255-4200, "42" is the block. A block is termed to be working if one or more listed telephone numbers are found in that block.*
>
> (Source: Survey Sampling International)

We received 3,978 numbers from SSI, and 3,810 numbers were called. Of the 3,810 numbers we called, 2,420 were working numbers and 1,390 were non-working numbers. Of the 2,420 working numbers, a person answered 1,287 (excluding the number answered by an answering machine), of which only 1,105 were eligible respondents. When there was an answering machine, the callers coded it as "answering machine" and the next day the number was called again. We allowed for six callbacks, but the actual callbacks ranged from zero to six. Most of the numbers only received one or two callbacks due to a lack of volunteer callers.

See Table 2 for the response rate. The 23 percent response rate in my survey is lower than other statewide telephone surveys and nationwide telephone surveys. Curtin, Presser, and Singer (2005) show that the response rates from telephone surveys have been steadily decreasing from 1979 to 2003, while refusal rates have increased. Their nation-wide telephone survey response rate dropped from 72 percent in 1979 to 48 percent in 2003. Curtin, Presser and Singer (2000) explain that the response rate has been decreasing because interviews have been much more difficult to obtain since 1979. "The average number of calls to complete an interview, for instance, more than doubled from 3.9 in 1979 to 7.9 in 1996" (Curtin, Presser, and Singer 2005: 88). Therefore, the limited number of callbacks we attempted might account for the lower response rate.

Another factor that might have contributed to the low response rate of this telephone survey is that I relied on volunteers to gather the data. While the volunteers went through a brief hour-long training on telephone survey interviewing, the variation in quality, dedication, and persistence of the callers can affect the quality of survey responses. A trained caller can increase

the response rate by keeping the caller interested and answering questions, which can also decrease the incomplete surveys. The survey also took several minutes to complete, which takes the skill of a trained interviewer to keep the respondent interested. Therefore, having trained interviewers and a shorter survey might have increased the response rate.

Also accounting for a low response rate is the increasing number of households who have cell phones. In the Americas, for every 100 people there are 94 cell phones (International Telecommunication Union). In fact, "in the last 6 months of 2008, [in the United States] more than one of every five households (20.2%) did not have a landline telephone but did have at least one wireless telephone" (Blumberg and Luke 2009: 2). Cell phones therefore contribute to two types of error, non-response error from people being more used to talking on their cell phones and not answering landlines, and sample bias due to the decreasing use of landlines. Because of these issues, telephone surveys need to increasingly include cellular telephones to have less sample bias and perhaps higher response rates. We did not keep information about who did not respond or why they refused to participate; therefore, we cannot say anything about non-response bias. Because of the low response rate and possible sample bias, this sample is unlikely to be representative of the adult residents of Tennessee.

Measurement of the Independent Variables

All of the variables in this analysis are listed in Table 5. To measure environmental attitudes, I used the New Ecological Paradigm (NEP) Scale developed by Dunlap (see Dunlap et al. 2002). In the survey participants answered all 15 questions that constitute the original NEP Scale, which has a reliability of 0.803. In this analysis, I use only the seven belief-oriented items, which have a reliability alpha of 0.811. The seven items I used in the NEP Scale held

together in the factor analysis and had the highest reliability alpha. See Table 3 for the specific questions included in the scale. This scale ranges from 1 to 29, with a mean of 19.37, which is slightly higher than the mid-point, meaning the sample is slightly skewed toward pro-ecological beliefs.

Access to recycling was measured by asking the participants if their city, town or county provided drop-off recycling and curbside recycling. Curbside recycling was reported by 30.7 percent of the respondents, while drop-off facilities were reported by 75.2 percent of the respondents.

Willingness to recycle was measured by asking the participants the following question: "Currently, how willing are you to recycle? Extremely Willing, Willing, Unwilling, or Extremely Unwilling?" Most respondents reported being extremely willing (40.5%) or willing (56.1%) to recycle, while very few respondents reported being unwilling and extremely unwilling (3.4%) to recycle.

I measured six social and geographic variables: race, gender, education, income, age, and urban/rural residence. I have two dichotomous variables, race and gender. For this sample, 10.5 percent of respondents are non-white and 89.5 percent white. Among respondents, 32.8 percent were male and 67.2 percent were female; I controlled for gender due to the over-representation of female respondents.

Education is an ordinal variable in this analysis and the distribution shows that only 4.5 percent did not finish high school, 23.1 percent have a high school diploma or G.E.D., 19.9 percent have some experience in college but no degree, 13.1 percent have an associate's or vocational degree, 24.0 percent report having a bachelor's degree, another 12.7 percent have a

master's or professional degree, and 2.7 percent report a doctorate. The distribution of this variable reveals that the education levels of sample respondents are higher than the general population in Tennessee.

The annual income variable consists of the following ordinal categories: less than $25,000 (16.1%), $25,000 - $49,999 (28.1%), $50,000 - $74,999 (24.0%), and $75,000 or more (31.8%). The distribution of the income variable is skewed toward the higher income categories. Age was measured in years with a range of 18 to 97, a mean of 54, and an approximately normal distribution.

I measured whether or not a person lived in a rural area based on the zip code he or she reported in the survey. The urban/rural information was compiled by the WWAMI Rural Health Research Center from the 2000 Census commuting data and 2004 ZIP codes (see RUCA 2006). Of the respondents in the survey, 50.7 percent live in urban areas, 28.1 percent live within 1 to 29 miles of an urban area (hereafter suburban), and 21.1 percent live 30 or more miles from an urban area (hereafter rural). Therefore, the distribution is skewed toward urban areas, while the actual distribution of Tennessee zip codes is: 36 percent urban, 30 percent suburban, and 34 percent rural.

Measurement of the Dependent Variables

I measured recycling behavior by summing the answers to 10 recycling questions, creating a Recycling Inventory. Respondents were asked if they recycled the following materials never (0), rarely (1), sometimes (2), usually (3), or always (4): Aluminum Cans, Steel Cans, Plastic Bottles, Plastic Grocery Bags, Light bulbs, Batteries, Scrap Metal, Paper, Cardboard, and Glass Bottles. The mean for the Recycling Inventory was 16.3, with a range from 1 to 41,

meaning that participants, on average, "rarely" to "sometimes" recycle. The distributions of the individual items in the Recycling Inventory are highly skewed toward either "never" or "usually" recycle, and the Recycling Inventory does not capture the variation of these individual items.

To measure food-buying behavior, there were five survey questions designed to be used as an index of ecologically conscious food-buying behavior. The index has a reliability of 0.562. See Table 1 for the specific questions included in the index.

To measure food-buying attitudes, there were six survey questions designed to be used as an index of ecologically conscious food-buying attitudes. The index has a reliability of 0.425, which needs improvement before it can be appropriately used as an index. See Table 1 for the specific questions included in this index.

To test for collinearity in my variables, I ran a correlation of all the variables. No variables are highly correlated with other variables.

Creating Food-Buying Scales. The food-buying behavior and attitude indices need improvement before they can be employed appropriately. A starting point will be to do an open-ended survey or interviews to gather information about the possible ecological questions that enter a person's head when buying food. This will help me identify items that are currently lacking in the food-buying indices. Next, I will test the reliability of the current index, by testing it against known groups – including groups that are known to be anti-environmentalist and groups that are known to be pro-environmental. This known-group testing will help me see if there is validity in what it is trying to measure – which is ecologically conscious food buying. A plan for this might include testing with "conventional" agricultural groups and "sustainable" agriculture groups. Once I can validate the measures, I can then administer another survey to a

random sample, including measures of ecological beliefs and environmentally friendly waste management techniques.

My long-range goal is to create a sustainable food and agriculture paradigm, much like Dunlap created the New Ecological Paradigm. This scale would contribute to the agri-foods literature because it would allow other researchers to conduct research about attitudes and behaviors toward sustainable food and agriculture, thus providing a means for consistency in the findings in the agri-foods literature.

Introduction to Next Section

The next chapter is a stand-alone article that I am submitting to the peer-reviewed journal *Environment and Behavior*. The article analyzes a subset of hypotheses from the more general study that pertain to recycling behavior. Currently, several other hypotheses cannot be analyzed reliably with the data I collected. For example, the ecologically conscious food buying (ECFB) indices (on food-buying attitudes and behaviors) are not yet reliable enough to make accurate population comparisons.

The topics that my survey touches on merit several academic papers that are beyond the scope of a master's thesis. The papers that I anticipate writing include a validation and improvement of the ECFB indices; testing the influence of structural context on recycling behavior; and measuring the interactions between all of the variables in this dataset, all of which will require collecting more data. The article presented in Chapter 2 focuses on one of the stronger areas of the dataset—the inventory of recycling behavior.

CHAPTER 2

RECYCLING BEHAVIOR IN TENNESSEE: TESTING THE A-B-C MODEL OF BEHAVIOR

To be submitted to the journal Environment and Behavior.

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ABSTRACT

This paper focuses on proenvironmental attitudes and behaviors and the interactions between recycling behavior, recycling availability, willingness to recycle, and ecological beliefs. Data for this study came from a telephone survey of Tennessee residents (N=270). Using OLS regression analysis, I find that recycling behavior is significantly related to access to recycling facilities. I do not find a significant interaction effect between access to recycling facilities and willingness to recycle. I conclude by suggesting that proenvironmental policies need to make structural resources more available to all in order to promote recycling (and protect the environment in general). Positive ecological beliefs alone do not explain much variance in recycling behavior.

INTRODUCTION

Human-induced climate change is an undeniable occurrence. Human behaviors that heat the atmosphere include the physical waste that humans discard, meaning the things we throw in the trash, what we flush down the toilet, and what we put down water drains. The waste accumulated with an affluent American lifestyle contributes 1.4 Gt CO2 e/year[2], most of which is from landfill sites and wastewater treatment (Stern 2007, p.246).

[2] 1.4 gigatons per year of carbon dioxide equivalents. Gigaton = one billion metric tons. Total U.S. emissions equaled 7.074 billion metric tons of CO2 equivalents (Pew Center on Global Warming).

Decreasing the greenhouse gas (GHG) emissions attributed to discarding and processing of solid waste is an important goal. Household waste reduction can keep gigatons of GHGs from entering the earth's atmosphere. Life cycle analysis of plastic recycling shows that recycling can conserve energy and materials, save money, reduce waste in landfills, and consequently reduce GHG emissions. As compared to the United Kingdom, which recovers (by recycling) 64% of its paper products and reuses 77%, the United States recovers 56% and reuses only 37% (Bratkovich et al. 2008, p.8). Therefore, the United States could be doing even more to reduce GHG emissions by promoting recycling programs and thus diverting the remaining 46% of paper products in the U.S. that go to landfills and incinerators.

Recycling mandates that propose reasonably achievable goals tend to be successful; however, states that mandate recycling cannot achieve 100% compliance. The city of Seattle, Washington implemented a citywide mandatory recycling program where residents' and businesses' trash would not be taken if it had more than 10% of recyclable materials in it. Businesses, not residences, would be fined if they had more than 10% recyclable material three times. Recycling rates increased from 38% in 2003 to 90% in 2006 as a result of this ordinance (Langston 2006).

Dietz et al. (2010) demonstrate that a behavioral approach to reducing GHG emissions succeeds if there are realistic targets, which they term "reasonably achievable emission reduction" (RAER). For instance, we know the compliance rate will not be 100% on all emissions reduction behavior, but we also know that some people are willing to change their behavior and therefore reduce GHG emissions. Gathering information about each GHG

reducing behavior will help ensure that policy implementation, public services, and social marketing campaigns are targeted and allocated appropriately.

Because recycling has the potential to substantially reduce Americans' GHG emissions, more research is needed to inform the policy, services, and marketing initiatives to promote recycling. The aim of this research is to learn more about recycling behavior by testing the importance of access to recycling through a survey of Tennessee households.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

To promote a behavioral approach to a reasonably achievable emissions reduction (RAER), we must have consistent and reliable scientific evidence on which we can base policy, services, and marketing initiatives. Sociological research on environmental behavior is growing, but there is little consistency in the methodology or findings. For instance, studies focus on dependent variables such as

- Recycling (Chen & Tung, 2010; Guerin, Crete, & Mercier, 2001)
- Index of environmentally friendly behavior (Tindall, Davies, & Mauboules, 2003)
- Environmental activism (Fielding, McDonald, & Louis, 2008)
- Household energy use (Poortinga, Steg, & Vlek, 2004).

Researchers have also examined a wide array of independent variables to predict environmental behaviors:

- Ideology (Guerin et al., 2001)
- Environmental attitudes/New Ecological Paradigm (NEP) (Chen & Tung, 2010; Dunlap et al., 2000; Fielding et al., 2008)
- Subjective norms (Chen & Tung, 2010; Fielding et al., 2008) and moral norms (Chen & Tung, 2010)
- Perceived behavioral control (Chen & Tung, 2010; Fielding et al., 2008)
- Intention (Fielding et al., 2008)
- Local activism (Guerin et al., 2001) and Activism (Tindall et al., 2003)

- Group membership/identity (Fielding et al., 2008; Guerin et al., 2001) and Self-identity (Fielding et al., 2008)
- Demographics: Education (Guerin et al., 2001; Tarrant & Cordell, 1997; Tindall et al., 2003); Income (Guerin et al., 2001; Tarrant & Cordell, 1997; Tindall et al., 2003); Gender (Tarrant & Cordell, 1997; Tindall et al., 2003); Age (Guerin et al., 2001; Tarrant & Cordell, 1997; Tindall et al., 2003); Urban/Rural (Tarrant & Cordell, 1997)
- Post-materialist values index (Tindall et al., 2003)
- Political orientation (Tarrant & Cordell, 1997).

Given the proliferation of variables of interest, testing a clear model can help alleviate some of this confusion. Several studies have used an attitude-behavior-context (A-B-C) model to help explain specific environmental behaviors such as recycling (Guagnano, Stern, & Dietz, 1995; Stern, 2000), while others have pursued interactional modeling with a larger number of variables (Bamberg, 2003; Stern et al., 1999).

The A-B-C model of behavior has been used in different ways in the literature. The attitude-behavior correspondence model suggests that behavior is predicted by attitudes. This theory has been used by several researchers in relation to environmental behaviors (see Olli, Grendstad, & Wollebaek, 2001). There is also the model that suggests that behaviors (B) are associated with attitudes (A) but also with external conditions (C). "The critical element in the model . . . is that the effect of A and C on behavior [B] depends on the values of A and C relative to each other rather than the value of either by itself" (Guagnano et al., 1995). See Figure 1 for a representation of the A-B-C model. This research tests the A-B-C model used by Guagnano et al. (1995), not the attitude-behavior correspondence explained by Olli et al. (2001).

The A-B-C model helps us measure the behavior, attitude, and context and helps us suggest an appropriate intervention. Figure 1 shows a few hypothetical situations charted on the attitude-context axes. This chart sketches out the proposed relationship between attitudes and

external conditions. Positive attitudes toward recycling can include feelings such as believing you are doing something good for the environment. Negative attitudes toward recycling include feeling that recycling is a waste of time. Positive external conditions can include the convenience of recycling or earning monetary rewards by recycling. Negative external conditions can include inconvenience or monetary penalties for recycling (such as having to pay for recycling services).

Figure 1. A-B-C Model

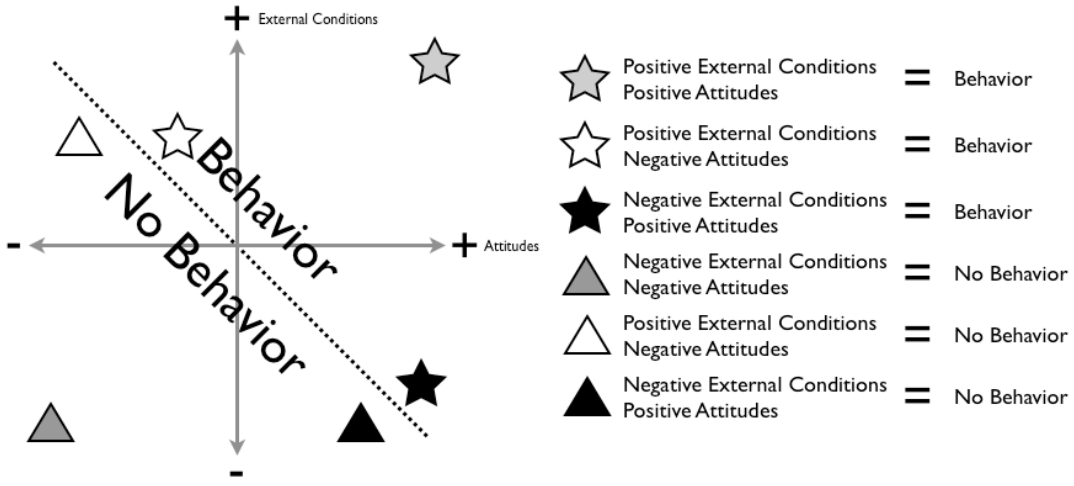
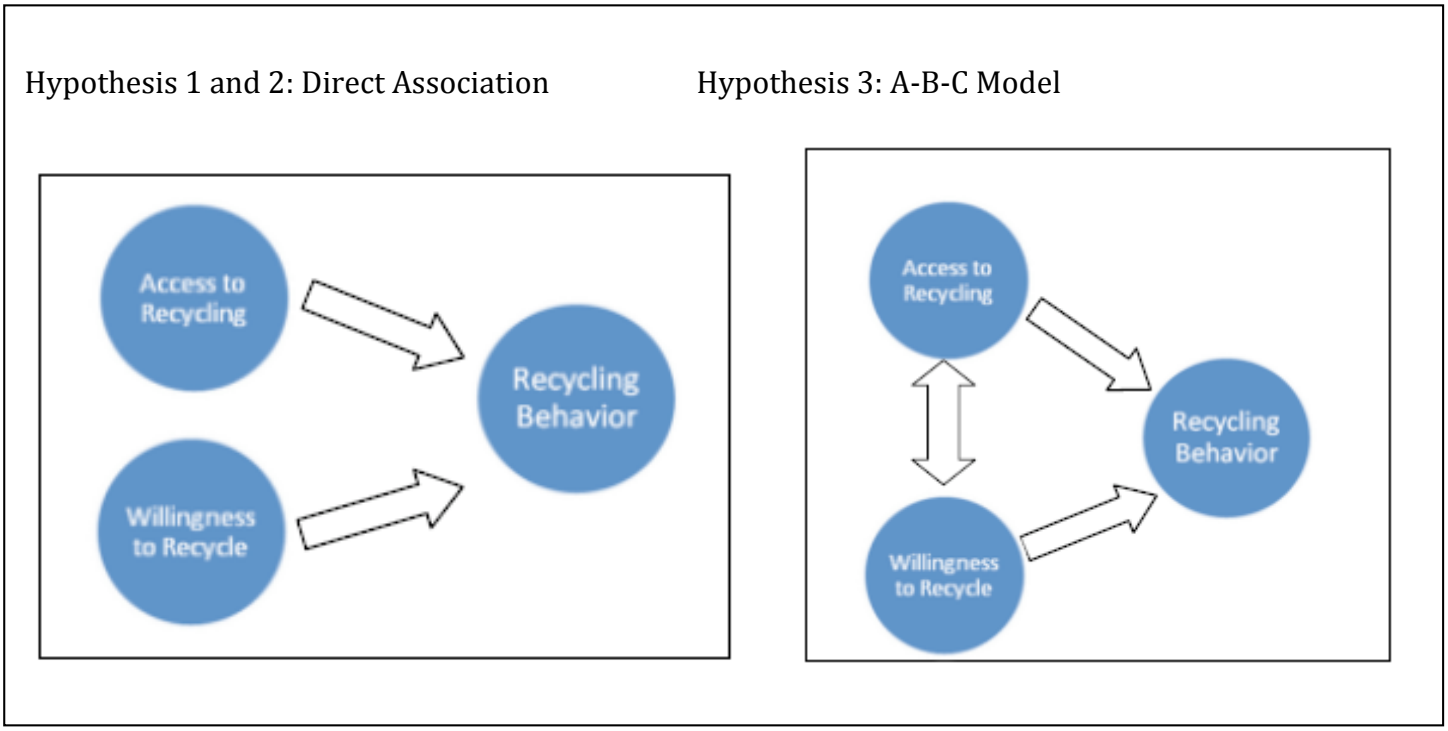


Figure 1 helps show that if attitudes toward a behavior are positive and the external conditions for a behavior are favorable, it is likely that the behavior will be present. On the other hand, if there are negative attitudes and unfavorable external conditions for a behavior, the behavior is unlikely to be present. Likewise, there is a point at which either positive attitudes or positive external conditions alone are not enough to get a person to recycle. Guagnano et al. (1995) found that "external conditions affected attitudinal processes independent of their direct effect (which is larger in this instance) on behavior" (714).

In this paper, I use the A-B-C model for predicting proenvironmental behaviors (PEB). The context variables include specific context, which is the person's perceived availability of recycling facilities, and I control for social and geographic characteristics. The specific attitudes are willingness to recycle, while the general attitudes are a person's environmental beliefs (measured by the New Ecological Paradigm Scale). I measure one specific behavior, which is recycling; Figure 2 sums up the A-B-C model I am testing in this paper.

Figure 2. Hypotheses



My specific research questions include (1) how can we explain recycling behavior in Tennessee? (2) Which factor is more important: willingness to recycle or access to recycling?

(3) Can the ABC model of behavior (Guagnano et al.1995) help us understand recycling behavior in Tennessee?

To answer these research questions, I pose three main hypotheses. See Figure 2 for the illustration of each hypothesis.

> ***Hypothesis 1:*** *The NEP Scale will be positively related to level of recycling.*
> ***Hypothesis 2:*** *The net effect of the specific attitude of willingness to recycle is expected to be greater than that of the NEP Scale.*
> ***Hypothesis 3:*** *Access to recycling will be positively related to the level of recycling, controlling for other predictors.*
> ***Hypothesis 4:*** *Interaction terms between context and attitudinal factors will add significantly to the explained variance of the Recycling Inventory.*

METHOD

Data Source, Participants, and Sampling Design

The data for this research were collected by telephone survey in March 2009 by volunteer undergraduate and graduate interviewers. I contracted Survey Sampling International[3] to create a random sample of Tennessee residents' home telephone numbers and to screen the sample for nonworking numbers. Therefore, the participants for this survey are based on a random sample of Tennessee residents. In my study, I am interested in households in the state of Tennessee. Below I explain more about the data collection process.

I planned to have a representative sample of Tennessee households, requiring 500 completed surveys. SSI estimates on average about 35% of the existing exchanges are in service

[3] Survey Sampling International (SSI) is a research assistance company for academics, market researchers, and other businesses. SSI specializes in surveys, including telephone, web-based, mail and in-person surveys. For telephone surveys, SSI starts with a working directory of all possible telephone exchanges in the area of interest.

at any time. SSI also estimates that about 90% of the people who answer the telephone will be eligible to participate in the survey but that only about 25% of those who answer the phone will complete the survey. Using logic, SSI randomly sampled from all of the existing exchanges in Tennessee to obtain 6,349 telephone numbers. Then SSI screens the sample using computer automated calling to eliminate telephone numbers that are disconnected. SSI says that the typical screened sample will eliminate 50% to 60% of the nonworking numbers. Therefore, the telephone list that I received was 3,978 telephone numbers, which is 63% of the 6,349 telephone numbers sampled. SSI's sample only included home telephone lines because they did not have access to cellular telephone numbers. Therefore the possibility that I obtained a representative sample of all adult Tennessee residents seems unlikely.

The only information that came with the telephone numbers was the time zone in which the telephone exchange is located (Eastern or Central Standard Time). There were no names, addresses, or identifying information on the telephone list.

SSI has three options of how to select the telephone sample. I chose the Equal Probability Selection Method in which "every possible telephone number [. . .] in a working block with at least one directory-listed telephone number has an equal probability of selection" (Survey Sampling International, n.d.). SSI explains the sampling procedure:

> *Most SSI samples are generated using a database of "working blocks." A block (also known as a 100-bank or a bank) is a set of 100 contiguous numbers identified by the first two digits of the last four digits of a telephone number. For example, in the telephone number 255-4200, "42" is the block. A block is termed to be working if one or more listed telephone numbers are found in that block.*
>
> (Source: Survey Sampling International n.d.)

We received 3,978 numbers from SSI, and 3,810 numbers were called. Of the 3,810 numbers, we called 2,420 working numbers, and 1,390 nonworking numbers. Of the 2,420 working numbers, a person answered 1,287 (excluding the number answered by an answering machine), of which only 1,105 were eligible respondents. When there was an answering machine, the callers coded it as "answering machine" and the next day the number was called again. We allowed for 6 callbacks, but the actual callbacks ranged from zero to six. Most of the numbers only received one or two callbacks due to a lack of volunteer callers.

I calculated the survey response rate by dividing the 252 completed interviews by the 1,105 total calls answered by an eligible respondent[4], getting a 23% response rate. The 23% response rate in my survey is lower than other statewide telephone surveys and nationwide telephone surveys. Curtin, Presser, and Singer (2005) show that the response rates from telephone surveys have been steadily decreasing from 1979 to 2003, while refusal rates have increased. Their nation-wide telephone survey response rate dropped from 72% in 1979 to 48% in 2003. Curtin, Presser and Singer (2000) explain that the response rate has been decreasing because interviews have been much more difficult to obtain since 1979. "The average number of calls to complete an interview, for instance, more than doubled from 3.9 in 1979 to 7.9 in 1996" (Curtin et al. 2005, p.88). Therefore, the limited number of callbacks we attempted might account for the lower response rate. Also accounting for a low response rate is the increasing number of households who have cell phones. In the Americas, for every 100 people there are 94 cell phones (International Telecommunication Union). In fact, "in the last 6 months of 2008, [in the United States] more than one of every five households (20.2%) did not have a landline

[4] Eligible respondents include people who are over the age of 18, live in Tennessee, and have English speaking proficiency. We also excluded businesses from the sample.

telephone but did have at least one wireless telephone" (Blumberg & Luke 2009, p.2). Cell phones therefore contribute to two types of error, nonresponse error from people being more used to talking on their cell phones and not answering landlines, and sample bias due to the decreasing use of landlines. Because of these issues, telephone surveys will need to increasingly include cellular telephones to have less sample bias and perhaps higher response rates. We did not keep information about who did not respond or why they refused to participate; therefore, we cannot say anything about nonresponse bias. Because of the low response rate and possible sample bias, this sample is unlikely to be representative of the adult residents of Tennessee. The complete sample size for this study adjusted for incomplete surveys is 270.

Measurement of the Independent Variables

All of the variables in this analysis are listed in Table 4. To measure environmental attitudes, I used the New Ecological Paradigm (NEP) Scale developed by Dunlap (see Dunlap et al. 2002). In the survey participants answered all 15 questions that constitute the original NEP Scale. In this analysis, I use 7 belief-oriented items, which have a reliability alpha of 0.811, which is quite acceptable. See Table 3 for the specific questions included in the scale. This scale ranges from 1 to 29, with a mean of 19.37, which is slightly higher than the mid-point, meaning the sample is slightly skewed toward proecological beliefs.

Access to recycling was measured by asking the participants if their city, town, or county provided drop-off recycling AND curbside recycling. Curbside recycling was reported by 30.7% of the respondents, while drop-off facilities were reported by 75.2% of the respondents.

Willingness to recycle was measured by asking the participants the following question: "Currently, how willing are you to recycle? Extremely Willing, Willing, Unwilling, or Extremely Unwilling?" Most respondents reported being extremely willing (40.5%) or willing (56.1%) to recycle, while very few respondents reported being unwilling and extremely unwilling (3.4%) to recycle.

Table 1. Questions used for the NEP Scale

Question Wording	Included in Scale?
GENERAL ENVIRONMENTAL ATTITUDES	
We are approaching the limit of the number of people the earth can support	Yes
The balance of nature is strong enough to cope with the impacts of modern industrial nations	Yes
When humans interfere with nature it often produces disastrous consequences	Yes
The so-called "ecological crisis" facing humankind has been greatly exaggerated	Yes
The balance of nature is very delicate and easily upset	Yes
If things continue on their present course, we will soon experience a major ecological catastrophe	Yes
Humans are severely abusing the environment	Yes
Humans have the right to modify the natural environment to suit their needs	No
Humans were meant to rule over the rest of nature	No
Plants and animals have as much right as humans to exist	No
Human ingenuity will insure that we do not make the earth unlivable	No
The earth has plenty of natural resources if we just learn how to develop them	No
Despite our special abilities humans are still subject to the laws of nature	No
The earth is like a spaceship with very limited room and resources	No
Humans will eventually learn enough about how nature works to be able to control it	No

I measured six social and geographic variables: race, gender, education, income, age, and urban residence. I have two dichotomous variables, race and gender. For this sample, 10.5% of

Table 2. Distribution, Coding, Mean and Standard Deviation for Variables in the Study

Variable	Coding	Categories	Freq	%	Mean	SD
Race	0	non-white	26	10.5	0.89	0.31
	1	white	221	89.5		
Gender	0	male	82	32.8	0.67	0.47
	1	female	168	67.2		
Annual Income	1	less than $25,000	39	16.1	2.71	1.08
	2	$25,000 to $49,999	68	28.1		
	3	$50,000 to $74,999	58	24.0		
	4	$75,000 or more	77	31.8		
Educational Attainment	1	some high school	10	4.5	3.78	1.58
	2	high school diploma or GED	51	23.1		
	3	some college	44	19.9		
	4	associate's or vocational degree	29	13.1		
	5	bachelor's degree	53	24.0		
	6	master's or professional degree	28	12.7		
	7	doctorate or beyond	6	2.7		
Rural / Urban	0	Urban	137	50.7	0.70	0.80
	1	Suburban	76	28.1		
	2	Rural	57	21.1		
Provide curbside recycling?	0	No	183	69.3	0.31	0.46
	1	Yes	81	30.7		
Provide drop off recycling?	0	No	67	24.8	0.75	0.43
	1	Yes	203	75.2		
Willingness to recycle	1	Extremely Unwilling & Unwilling	9	3.4	2.37	0.55
	2	Willing	148	56.1		
	3	Extremely Willing	107	40.5		
Age	18 to 99	--	--	--	53.53	15.77
NEP Scale	1 to 29	--	--	--	19.37	6.08
Recycling Inventory	1 to 41	--	--	--	16.33	12.34

respondents are nonwhite and 89.5% white. Among respondents, 32.8% were male and 67.2% were female; I controlled for gender due to the over-representation of female respondents.

Education is an ordinal variable in this analysis and the distribution shows that only 4.5% did not finish high school, 23.1% have a high school diploma or G.E.D., 19.9% have some experience in college but no degree, 13.1% have an associate's or vocational degree, 24.0% report having a bachelor's degree, another 12.7% have a master's or professional degree, and 2.7% report a doctorate. The distribution of this variable reveals that the education levels of sample respondents are higher than the general population in Tennessee.

The annual income variable consists of the following ordinal categories: less than $25,000 (16.1%), $25,000 - $49,999 (28.1%), $50,000 - $74,999 (24.0%), and $75,000 or more (31.8%). The distribution of the income variable is skewed toward the higher income categories. Age was measured in years with a range of 18 to 97, a mean of 54, and an approximately normal distribution.

I measured whether or not a person lived in a rural area based on the zip code he or she reported in the survey. The urban residence information was compiled by the WWAMI Rural Health Research Center from the 2000 Census commuting data and 2004 ZIP codes (see RUCA 2006). Of the respondents in the survey, 50.7% live in urban areas, 28.1% live within 1 to 29 miles of an urban area (hereafter suburban), and 21.1% live 30 or more miles from an urban area (hereafter rural). Therefore, the distribution is skewed toward urban areas since the actual distribution of Tennessee zip codes is: 36% urban, 30% suburban, and 34% rural.

Measurement of the Dependent Variable

I measured recycling behavior by summing the answers to 10 recycling questions, creating a Recycling Inventory. Respondents were asked if they recycled the following materials never (1), rarely (2), sometimes (3), usually (4), or always (5): Aluminum Cans, Steel Cans, Plastic Bottles, Plastic Grocery Bags, Light bulbs, Batteries, Scrap Metal, Paper, Cardboard, and Glass Bottles. The mean for the Recycling Inventory was 16.3, with a range from 0 to 42, meaning that participants, on average, "rarely" to "sometimes" recycle.

To test for possible collinearity among my variables, I ran a correlation of all the variables. No variables are highly correlated with other variables.

RESULTS

The primary purpose of this analysis is to test the central hypotheses previously stated that are based on the A-B-C model of behavior. Given the measurement properties of the dependent variable and the various independent variables as well as the sample size (n=270) ordinary least squares regression is an appropriate technique to test the hypotheses.

I run four models testing the four hypotheses: Model 1 tests the control variables, Model 2 tests Hypothesis 1 and 2 about environmental and recycling attitudes, Model 3 tests Hypothesis 3 about recycling context, and Model 4 tests the interaction between attitudinal and context variables. The following results are organized by model (see Table 3).

Table 3. Regression Results, Recycling Inventory is Dependent Variable.

	1	2	3	4
Race (white = 1)	1.087	1.074	2.001	1.954
	(2.859)	(2.567)	(2.459)	(2.489)
Gender (female = 1)	1.764	-0.491	-0.117	-0.054
	(1.795)	(1.64)	(1.568)	(1.588)
Age	-0.019	-0.01	-0.032	-0.034
	(0.059)	(0.053)	(0.051)	(0.053)
Education (contrast = high school diploma or less)				
Some college	-0.08	-0.148	1.127	0.86
	(2.519)	(2.258)	(2.183)	(2.232)
Associate's/Trade Degree	1.561	0.571	2.009	1.728
	(2.804)	(2.519)	(2.423)	(2.481)
Bachelor's Degree	4.711	2.886	3.566	3.419
	(2.51)	(2.274)	(2.179)	(2.224)
MA or Doctorate	4.885	3.688	4.258	3.981
	(2.837)	(2.546)	(2.434)	(2.491)
Income (contrast = $75,000 and above)				
Less than $25,000	0.953	0.738	1.121	1.283
	(2.951)	(2.648)	(2.549)	(2.602)
$25,000 to 49,999	-2.468	-1.547	-1.562	-1.645
	(2.255)	(2.044)	(1.949)	(1.981)
$50,000 to 74,999	1.033	1.229	0.758	0.729
	(2.421)	(2.172)	(2.074)	(2.097)
Urban/Rural (contrast = Urban)				
Suburban	-2.989	-2.185	-1.634	-1.687
	(2.041)	(1.835)	(1.775)	(1.795)
Rural	0.112	1.091	0.744	0.727
	(2.407)	(2.193)	(2.109)	(2.139)
Willingness to recycle	--	9.899***	9.743***	8.082**
		(1.441)	(1.375)	(3.003)
Environmental Belief (NEP)	--	0.023	0.001	0.049
		(0.131)	(0.125)	(0.242)
Access to drop-off	--	--	6.598***	4.178
			(1.729)	(9.655)
Access to curbside	--	--	3.227*	0.137
			(1.63)	(8.692)
Interaction Variables				
NEP x Curbside Access	--	--	--	-0.04
				(0.276)
NEP x Drop-off Access	--	--	--	-0.046
				(0.288)

	1	2	3	4
Willingness x Drop-off Access	--	--	--	1.402 (3.35)
Willingness x Curbside Access	--	--	--	1.613 (2.946)
(Constant)	14.907** (4.68)	-7.936 (5.573)	-13.819* (5.484)	-10.546 (9.51)
R2	**0.065**	**0.257**	**0.332**	**0.334**
Model Significance	0.340	0.000	0.000	0.000

* p<0.05, **p<0.01, ***p<0.001

Model 1 determines the effect of the social and geographic control variables on recycling behavior. The R-square is 0.064, and none of the demographics are significant predictors of recycling behavior. The regression model shows (although not statistically significantly) that age is negatively correlated with recycling behavior, meaning that with each year increase in age, the score on the recycling inventory goes down. A negative coefficient is also shown for the households making $25,000 to $49,999 and for the group of people living in suburban areas. The race variable shows that in my sample white people are more likely to recycle than nonwhites. Likewise, gender is positively associated with recycling behavior, showing that females are more likely to recycle than males. However, in both the race and gender categories, the statistical nonsignifcance may be due more to a large standard error caused by the small number of nonwhite and male respondents than to the small size of the coefficient. Similarly, the education categories "Bachelor's" and "MA or Doctorate" might be nonsignificant due to the relatively small number of respondents in these categories.

Hypothesis 1 states: *The NEP Scale will be positively related to level of recycling.* Hypothesis 2 states: *The net effect of the specific attitude of willingness to recycle is expected to be greater than that of the NEP Scale.*

To test these hypotheses, Model 2 includes the net effects of general environmental beliefs and specific willingness to recycle on recycling behavior. The R-square is 0.257, and none of the variables are significant predictors of recycling behavior. Both environmental beliefs and willingness to recycle are positively associated with recycling behavior, but neither of these variables are statistically significant predictors.

The positive or negative associations of most of the social and geographic variables are the same in Model 2 as in Model 1 with the exception of gender. In Model 1 gender is positively associated with recycling behavior, meaning that females are more likely to recycle, but in Model Two, with the inclusion of the attitudinal variables, gender is negatively related to recycling behavior, meaning that men are more likely to recycle than women. However, the gender contrast as well as all the other predictors are not statistically significant in Models 1 or 2.

Hypothesis 3 states: *Access to recycling will be positively related to the level of recycling, controlling for other predictors.*

To test this hypothesis, I use Model 3. Model 3 exhibits the effect of access to recycling on recycling behavior. The R-square is 0.332, and the access to recycling variables as well as the willingness to recycle variable are significant predictors of recycling behavior. Because willingness to recycle is not significant in Model 2 but is significant in Model 3, it shows that willingness to recycle is significant when in the same model as access to recycling variables, indicating that when these two variables (attitudes and context) are taken together, they have more predictive ability than when considered alone.

The education variables changed in Model 3. While the "Some College" category was negatively associated with recycling behavior in Models 1 and 2, in Model 3 the "Some College"

category is positively related to recycling behavior. Interestingly, in Model 3 the coefficients for all four education groups increase as education increases – "Some College" (1.128), "Associate's" (2.049), "Bachelor's" (3.565), and "MA or Doctorate" (4.258); however, these dummy contrasts remain nonsignificant.

Model 3 supports Hypothesis 2. In Model 1 the social and geographic variables alone do not explain much variance in recycling behavior (6%), but in Model 3, when including the context variables (access to curbside and drop-off recycling), the explained variance is much higher (33%). Therefore, specific context variables are significant predictors of recycling behavior.

Hypothesis 4 states: *The interaction between context and attitudinal variables will have a greater net effect than either context or attitudinal variables alone.*

To test this hypothesis, Model 4 determines the effects of the interaction terms between attitude and context variables on recycling behavior. The R-square is 0.335, and the only significant predictor is willingness to recycle.

The nonsignificance of the interaction variables and the trivial increase in explained variance (from 32.2% to 32.5%) indicates that the effects of the generalized orientation (NEP) and specific orientation (Willingness to Recycle) on Recycling Behavior do not differ by access to recycling. Thus, Model 3 is the most parsimonious and powerful model for the dependent variable.

DISCUSSION:

THE A-B-C MODEL OF ENVIRONMENTALLY SIGNIFICANT BEHAVIOR

These hypotheses lay the groundwork for testing the A-B-C model of environmentally significant behavior by examining three relationships: the effect of attitudes on behavior, the effect of context on behavior, and the effect of the interaction between attitudes and context on behavior. Here I examine if I found support for the A-B-C model.

Even though most people in the survey did not have access to curbside recycling (69%), most people in the survey did have access to drop-off recycling (75%), and 80% of the respondents had access to either drop-off or curbside recycling. Because a majority of the respondents had access to either curbside or drop-off recycling, the recycling context for the respondents is conducive to recycling behavior. However, the average Recycling Inventory score was a 16.3 on a scale of 1-41, showing that on average the people in the sample only rarely to sometimes recycle. Therefore the access to recycling variables are skewed toward having access to recycling while the reported recycling behavior variables are skewed toward not recycling.

While the interaction variables in Model 4 are not significant, willingness to recycle is a significant predictor of recycling behavior. In Model 3, without accounting for the interaction, both access to recycling and willingness to recycle are significant predictors, while in Model 2, willingness to recycle is not significant when considered without access variables or interactional variables. Model 4 shows that the interactions are unimportant and that the net effects of "willingness" and "access" are relatively independent of each other. Therefore, Model 3, the additive model, is the best model, and I do not find support for the A-B-C model of

environmental behavior.

CONCLUSION

Just as Stern et al. (1999) argue that sociologists need to go further by researching links between *specific* environmental attitudes and *specific* environmental behaviors, I support the need for research that goes beyond the specificity in my study and examines an environmentally significant behavior in relation to its specific context and specific attitudes. The need for specificity is supported by the limited ability of general environmental beliefs, measured by the NEP scale, to predict environmentally significant behavior in this study. It might also be the case that general beliefs do not predict behavior in other realms as well. For instance, a general attitude toward humankind (altruism) might not predict the level of charitable giving. While the NEP remains a reliable scale, it may have outlived its usefulness in explaining proenvironmental behaviors.

As for the study of recycling behavior, there are ways to improve the measures of recycling behavior, access to recycling, and willingness to recycle. The measure of recycling behavior used in this study, the Recycling Inventory, summed 10 separate items ranging from light bulbs and scrap metal to plastic bottles and aluminum cans that one *could* recycle if facilities were available. However, the question about access to recycling only asked about drop-off facilities or curbside recycling programs, without getting into the details about what types of materials are accepted at drop-off facilities or what curbside programs will accept. Having more specific information about the availability of facilities for each item in the Recycling Inventory would make a stronger analysis because a person's attitudes toward recycling light bulbs might

differ from their attitudes toward recycling aluminum cans based on the availability of facilities for each of these items. Therefore, asking about a person's willingness to recycle and access to recycling in regard to a specific item such as aluminum cans might yield more significance than asking more general questions about recycling.

Beyond elaborating on the Recycling Inventory, gathering more specific structural and infrastructural context data on recycling would be beneficial; examples include gathering data about the cost of recycling programs, the cost of trash removal, travel distance to recycling drop-off, the variety of materials accepted by the local recycling service, and the distance to the nearest landfill or trash incinerator. The social context data such as having neighbors who recycle, having friends who recycle, and living in a city that is generally promoted as a "green" city would be beneficial as well. It is also important to gather data on more specific attitudes such as how people feel about the process of recycling; do they feel like recycling does any good; do they care about where their waste goes? No matter how specific a study is in identifying the influences of a behavior, the challenge of acquiring accurate information on self-reported behaviors remains a concern because people can always say one thing but do something else. Although more time intensive than a telephone survey, there are methodologies designed to overcome the self-reported behavior and actual behavior inconsistency such as directly observing a participant's behavior or conducting trash audits on a participant's household waste.

This study does not find support for the A-B-C model of environmentally significant behavior, but continued research is necessary. If social scientists want to minimize anthropogenic climate change, we need a sharper understanding of the specific interactions between context and attitudes as they relate to GHG-reducing proenvironmental behaviors. This

research should be shared with those who are concerned about climate change and the impacts of household waste and used to coordinate with policy makers, social marketing and educational campaigns, and corporate entities to design effective interventions that will reduce human-induced GHG emissions. Moreover, because environmental marketing programs are rarely implemented, there is a huge opportunity to connect in people's minds the idea that various specific actions can have an impact on the more general picture of environmental progress. If people do not see that our currently handling of trash leads to global warming, they're unlikely to do anything at the individual level even if they are supportive of more general proenvironmental views.

REFERENCES

Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *Journal of Environmental Psychology, 23*, 21 –32.

Bratkovich, S., Bowyer, J., Fernholz, K., & Howe J. (2008). Paper recycling in the United States and beyond: An update. *Dovetail Partners Inc.* Accessed January 6, 2011: http://www.dovetailinc.org/files/DovetailRecyclePaper0908bpn.pdf

Chen, M.F., & Tung, P.J. (2010). The moderating effect of perceived lack of facilities on consumers' recycling intentions. *Environment and Behavior, 42,* 824-844.

Dietz, T., Gardner, G.T., Gilligan, J., Stern, P.C., & Vandenbergh, M.P. (2010). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academies of Science, 106,* 18452–18456.

Dunlap, R., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000). Measuring endorsement of the new ecological paradigm: A Revised NEP Scale. *Journal of Social Issues, 56,* 425–442.

Fielding, K.S., McDonald, R., & Louis, W.R., (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology, 28*, 318–326.

Guagnano, G.A., Stern, P.C., & Dietz, T. (1995). Influences on attitude-behavior relationships: A natural experiment with curbside recycling. *Environment and Behavior, 27,* 699-718.

Guerin, D., Crete, J., & Mercier, J. (2001). A multilevel analysis of the determinants of recycling behavior in the European countries. *Social Science Research, 30,* 195–218.

Langston, J. (2006). Mandatory recycling program working well. *Seattle P.I.* March 15. Accessed November 22, 2010 http://www.seattlepi.com/local/262968_nsecondary15.html

Olli, E., Grendstad, G., & Wollebaek, D. (2001). Correlates of environmental behaviors: Bring back social context. *Environment and Behavior, 33,* 181-208.

Poortinga, W., Steg, L., & Vlek, C. (2004). Values, environmental concern, and environmental behavior: A study into household energy use. *Environment and Behavior, 36,* 70-93.

RUCA. (2006). RUCA Data. Rural Health Research Center. Retrieved December 1, 2010 (http://depts.washington.edu/uwruca/ruca-download.php)

Stern, P.C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56,* 407–424.

Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6,* 81-97.

Tarrant, M.A., & Cordell, H.K. (1997). The effect of respondent characteristics on general environmental attitude-behavior correspondence. *Environment and Behavior, 29,* 618-637.

Tindall, D.B., Davies, S., & Mauboules, C. (2003). Activism and conservation behavior in an environmental movement: The contradictory effects of gender. *Society and Natural Resources, 16,* 909–932.

REFERENCES

Albrecht, Don E., Gordon Bultena, and Eric Holberg. 1986. "Constituency of the antigrowth movement: A comparison of the growth orientation of urban status groups." *Urban Affairs Quarterly*. 21: 607-616.

Barr, Stewart, Andrew W. Gilg, and Nicholas J. Ford. 2001. "Differences Between Household Waste Reduction, Reuse and Recycling Behavior: a Study of Reported Behaviors, Intentions and Explanatory Variables." *Environmental & Waste Management.* 4(2): 69-82.

Beagan, Brenda L., Svetlana Ristovski-Slijepcevic, Gwen E. Chapman. 2010. "People Are Just Becoming More Conscious of How Everything's Connected': 'Ethical' Food Consumption in Two Regions of Canada." *Sociology.* 44(4): 751-769.

Blake, Megan K., Mellor, Jody and Crane, Lucy. 2010. "Buying Local Food: Shopping Practices, Place, and Consumption Networks in Defining Food as 'Local.'" *Annals of the Association of American Geographers*, 100(2): 409 - 426.

Blumberg, Stephen J., and Julian V. Luke. 2009. "Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December 2008." Centers for Disease Control and Prevention. Retrieved January 3, 2011 (http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless200905.pdf).

Catton, William R. Jr. and Riley E. Dunlap. 1980. "A New Ecological Paradigm for a Post-Exuberant Sociology." *American Behavioral Scientist.* 24(1): 15-47.

Clark, Christopher F., Matthew J. Kotchen, and Michael R. Moore. 2003. "Internal and external influences on pro-environmental behavior: Participation in a green electricity program." *Journal of Environmental Psychology*. 23: 237-246.

Cope, S., L. J. Frewer, J. Houghton, G. Rowe, A. R. H. Fischer and J. de Jonge. 2010. "Consumer perceptions of best practice in food risk communication and management: Implications for risk analysis policy." *Food Policy*. 35(4): 349-357.

Curtin, R., S. Presser, and Eleanor Singer. 2005. "Changes in Telephone Survey Nonresponse Over the Past Quarter Century." *Public Opinion Quarterly*, 69: 87-98.

Curtin, R., S. Presser, and Eleanor Singer. 2000. "The Effects of Response Rate Changes on the Index of Consumer Sentiment." *Public Opinion Quarterly*, 64: 413-428.

Dietz, Thomas, Linda Kalof, and Paul C. Stern. 2002. "Gender Influences on the Meaning and Structure of Values." *Social Science Quarterly* 83: 351-364.

Dietz, Thomas, Paul C. Stern and Gregory A. Guagnano. 1998. "Social Structural and Social Psychological Bases of Environmental Concern." *Environment and Behavior* 30: 450-471.

Drummond, William J. 2010. "Statehouse Versus Greenhouse." *Journal of the American Planning Association*. 76(4): 413-433.

Dunlap, Riley, Kent D. Van Liere, Angela G. Mertig, Robert Emmet Jones. 2000. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." *Journal of Social Issues,* 56(3) 425-442.

Dunlap, Riley. E. and Kent D. Van Liere. 1984. "Commitment to the dominant social paradigm and concern for environmental quality." *Social Science Quarterly*. 65: 1013–1028.

Dunlap, Riley E. 1980. "Paradigmatic Change in Social Science: From Human Exemptionalism to an Ecological Paradigm." *American Behavioral Scientist*. 24: 5-14.

Dunlap, Riley. E. and Kent D. Van Liere. 1978. "The 'new environmental paradigm': A proposed measuring instrument and preliminary results." *Journal of Environmental Education*. 9: 10-19.

Foxall, Gordon R., Jorge M. Oliveira-Castro, Victoria K. James, M. Mirella Yani-de-Soriano, Valdimar Sigurdsson. 2006. "Consumer Behavior Analysis and Social Marketing: The Case of Environmental Conservation." *Behavior and Social Issues.* 15: 101-124.

Goodman, Jack. 2008. "Who Does the Grocery Shopping, and When Do They Do It?" The Time Use Institute. October 2008. Retrieved on December 22, 2010 (http://www.fmi.org/forms/uploadFiles/412C30000000E.toc.Time_Use_Institute_Preview_2008.pdf).

Hansen, Art. 1994. "The illusion of local sustainability and self-sufficiency: famine in a border area of northwestern Zambia." *Human Organization*. 53: 11-20.

Hirsh, Jacob B. and Dan Dolderman. 2007. "Personality predictors of consumerism and Environmentalism: A preliminary study." *Personality and Individual Differences*. 43: 1583-1593.

Ikerd, John. 2006. "Sustaining the Common Wealth of Rural People and Places." Presented at Sharing Knowledge on Rural Life in Atlantic Canada: A Learning Event, Sponsored by Cape Breton University, at Mabou, Nova Scotia, Canada, July 19-21, 2006.

International Telecommunication Union. Retrieved January 4, 2011 (http://www.itu.int/ITU-D/ict/statistics/material/graphs/2010/mobile_reg-10.jpg).

Jones, Jeffrey M. 2009. “Political Party Affiliation: 30 States Blue, 4 Red in '09 So Far Utah and Wyoming are most Republican.” Gallup Poll Report *State of the States* August 3, 2009. Retrieved on December 22, 2010 (http://www.gallup.com/poll/122003/political-party-affiliation-states-blue-red-far.aspx).

Jones, Robert Emmet, J. Mark Fly, and H. Ken Cordell. 1999. “How Green is My Valley? Tracking Rural and Urban Environmentalism in the Southern Appalachian Ecoregion.” *Rural Sociology.* 64(3): 482-99.

Johnson, Cassandra Y., J.M Bowker, and H.Ken Cordell. 2004. “Ethnic variation in environmental belief and behavior: An examination of the new ecological paradigm in a social psychological context.” *Environment and Behavior*. 36(2): 157-86.

Kanagy, Conrad, Craig Humphrey and Glenn Firegaugh. 1994. “Surging Environemntalism: Changing Public Opinion or Changing Publics?” *Social Sciences Quarterly.* 75: 804-19.

Kosmin, Barry, Egon Mayer, and Ariela Keysar. 2001. “American Religious Identification Survey, 2001.” The Graduate Center of the City University of New York Report Decemer 19, 2001. Retrieved November 28, 2010 (http://www.gc.cuny.edu/faculty/research_briefs/aris/key_findings.htm).

Kriege-Steffen, A.; Boland, H.; Lohscheidt, J.; Schneider, F.; Stolze, M. (2010): Transparent food and consumer trust. 4th International European Forum on System Dynamics and Innovation in Food Networks. February 08-12, 2010 in Innsbruck – Igls, Austria http://bscw.ilb.uni-bonn.de/fsdcommunity/bscw.cgi/d178308/Kriege-Steffen.pdf

Leonard, Annie. 2010. *The Story of Stuff: How Our Obsession with Stuff Is Trashing the Planet, Our Communities, and Our Health-and a Vision for Change.* Free Press, New York, New York.

Linn, Nancy, Joanne Vining, and Patricia Ann Feeley. 1994. “Toward a sustainable society: waste minimization through environmentally conscious consuming.” *Journal of Applied Social Psychology*. 24: 1550-72.

Little R, Maye D, Ilbery B, 2010, "Collective purchase: moving local and organic foods beyond the niche market" *Environment and Planning.* 42(8): 1797-1813.

Magkos F, Arvaniti F, Zampelas, A. 2006. "Organic food: Buying more safety or just peace of mind? A critical review of the literature." *Critical Reviews in Food Science and Nutrition.* 46(1): 23-56.

Martinez, Steve, and David E. Davis. 2002. “Farm Business Practices Coordinate Production With Consumer Preferences.” *FoodReview*. 25(1): 33-8.

McCright, Aaron. 2010. “The effects of gender on climate change knowledge and concern in the American public.” *Population and Environment.* 32: 66-87.

Nurse, Gretchen, Yuko Onozaka, and Dawn Thilmany McFadden. 2010. "Understanding the Connections between Consumer Motivations and Buying Behavior: The Case of the Local Food System Movement." Selected Paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting, Orlando, FL, February 6-9, 2010. Retrieved on January 1, 2011 (http://ageconsearch.umn.edu/bitstream/56494/2/SAEApaper_final_Nurse.pdf).

Pew. 2009. “Fewer Americans See Solid Evidence of Global Warming, Modest Support for "Cap and Trade" Policy.” The Pew Research Center for the People and the Press. Report October 22, 2009. Retrieved January 5, 2011 (http://people-press.org/report/556/global-warming).

Pierce, John C., Nicholas P. Lovirch, Taketsugu Tsurutani and Takematsu Abe. 1987. “Environmental belief systems among Japanese and American elites and publics.” *Political Behavior*. 9: 139–159.

RUCA. 2006. “RUCA Data.” Rural Health Research Center. Retrieved December 1, 2010 (http://depts.washington.edu/uwruca/ruca-download.php)

Russell, Cheryl. 1997. “What spending spree?” *American Demographics*. 19(9): 14-19.

Sathaye, Nakul, Robert Harley, Samer Madanat. 2010. “Unintended environmental impacts of nighttime freight logistics activities.” *Transportation Research Part A: Policy & Practice*. 44(8): 642-659.

Scott, David, and Fern K. Willits. 1994. “Environmental Attitudes and Behavior: A Pennsylvania Survey.” *Environment and Behavior*. 26(2): 239-260.

Shilling, Fraser M., Jonathan K. London, Raoul S. Liévanos. 2009. “Marginalization by collaboration: Environmental justice as a third party in and beyond CALFED.” *Environmental Science & Policy*. 12(6): 694-709.

Slimak, Michael W. and Thomas Dietz. 2006. “Personal Values, Beliefs, and Ecological Risk Perception.” *Risk Analysis.* 26(6): 1689-1705.

Stern, Paul C., Thomas Dietz, Troy Abel, Gregory A Guagnano, and Linda Kalof. 1999. “A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism.” *Human Ecology Review*. 6(2): 81-97.

Stern, Paul. C., Thomas Dietz, and G.A. Guagnano. 1995. “The new ecological paradigm in

social-psychological context." *Environment and Behavior*. 27: 723–743.

Sze, Julie; Gerardo Gambirazzio; Alex Karner; Dana Rowan; Jonathan London; Deb Niemeier. 2010. "Best in Show? Climate and Environmental Justice Policy in California." *Environmental Justice.* 2(4): 179-184.

Tarkianinen, Anssi, and Sanna Sundqvist. 2005. "Subjective norms, attitudes and intentions of Finnish consumers in buying organic food." *British Food Journal.* 107(11): 808-822.

Tarrant, Michael A., and H. Ken Cordell. 1997. "The Effect of Respondent Characteristics on General Environmental Attitude-Behavior Correspondence." *Environment and Behavior*. 29(5): 618-637.

Thogersen, John, and Folke Olander. 2006. "Personal Norms and Environment-Friendly Buying Behavior: A Panel Study." *Journal of Applied Social Psychology.* 36(7): 1758–1780.

Toxic Release Inventory. 2009a. "Releases: Geography US State Report." United States Environmental Protection Agency, TRI Explorer. Retrieved November 28, 2010 (http://www.epa.gov/triexplorer/geography.htm).

Toxic Release Inventory. 2009b. "State Fact Sheet." United States Environmental Protection Agency, Toxic Release Inventory. Retrieved November 28, 2010 (http://www.epa.gov/triexplorer/statefactsheet.htm).

Trust for America's Health. 2010. "State Data: Tennessee." Retrieved November 28, 2010. (http://healthyamericans.org/states/?stateid=TN).

Van Liere, Kent D. and Riley Dunlap. 1980. "The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence." *Public Opinion Quarterly.* 44(2): 181-197.

APPENDICES

APPENDIX A: RESPONSE RATE INFORMATION

Working Numbers: Where we ***talked*** to someone (total = 1287)	
Completed Surveys	*252*
Incomplete Surveys	*15*
Total: Surveys with Data	**267**
Request to be Called Back	*120*
Refused to Participate	*693*
Asked to be put on the Do Not Call List	*25*
Total: Did not participate	**838**
Language Barrier	*13*
Business	*165*
Ineligible Respondent	*4*
Total: Could not participate	**182**

Working Numbers: Where we ***did not talk*** to someone (total = 1,133)	
No Answer	*570*
Number was Busy	*81*
Answering Machine	*482*
Total: Did not answer the phone	**1133**

Non-Working Numbers (total = 1390)	
Non Working Number	*1390*

APPENDIX B: QUESTIONS USED FOR SCALES

Questions used for Scales

Question Wording	Included in Scale?
FOOD BUYING BEHAVIOR	
I make an effort to buy meat and dairy products produced from humanely treated animals.	✓
I go out of my way to buy food that is sold in environmentally friendly packaging.	✓
I don't usually look to see if my food is labelled with information about where it was grown.	✓
I try to get my food locally, by growing it myself or getting it from nearby growers.	✓
In the store, I cannot distinguish between environmentally friendly and harmful food products.	✓
FOOD BUYING ATTITUDES	
Farmers should use chemical pesticides when growing our food.	✓
I don't usually want to buy organic foods.	✓
If organic and non-organic foods cost the same, I prefer the organic foods.	✓
If scientists can change plant seeds so that they grow into bigger and better tasting plants, they should do so.	✓
For me, price is the most important things when it comes to buying food.	✓
I feel better, physically, if I eat fresh foods.	✓
GENERAL ENVIRONMENTAL ATTITUDES	
We are approaching the limit of the number of people the earth can support	✓
The balance of nature is strong enough to cope with the impacts of modern industrial nations	✓
When humans interfere with nature it often produces disastrous consequences	✓
The so-called "ecological crisis" face humankind has been greatly exaggerated	✓
The balance of nature is very delicate and easily upset	✓
If things continue on their present course, we will soon experience a major ecological catastrophe	✓
Humans are severely abusing the environment	✓
Humans have the right to modify the natural environment to suit their needs	
Humans were meant to rule over the rest of nature	
Plants and animals have as much right as humans to exist	

Questions used for Scales
Human ingenuity will insure that we do not make the earth unlivable
The earth has plenty of natural resources if we just learn how to develop them
Despite our special abilities humans are still subject to the laws of nature
The earth is like a spaceship with very limited room and resources
Humans will eventually learn enough about how nature works to be able to control it

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