Investigating Factors that Influence an Ecological Attitude- Behavior Gap among Oregonians

by

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AN ABSTRACT OF THE THESIS OF

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Title: Investigating Factors that Influence an Ecological Attitude- Behavior Gap among Oregonians

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This study examines the determinants of food consumption behaviors, such as purchasing less meat products, paying attention to how and where food is produced, and reducing food waste within the household. Food consumption is particularly important given that it can often comprise between 10% to 30% of the total household GHG emissions. To better understand what situational and social-cognitive factors affect Oregon household ecological food consumption behaviors beyond belief that climate change will cause dramatic and long-term changes in the United States, a cross-sectional OLS regression analysis was employed within a modified reasoned action approach framework. The four main factors of interest that were hypothesized to impact ecological food consumption behavior were behavioral beliefs, means, access, and information. Results from the regression show that behavioral beliefs are a statistically significant factor that positively influences the engagement in ecological behavior. In addition, work status, political ideology, revised-NEP, and gender also displayed a relationship with food consumption behavior.
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INTRODUCTION:

Climate change is an existential global challenge that span multiple dimensions of society, including issues related to human health, the economy, water and food supplies, politics, and the environment (Crimmins et al., 2016; EPA, 2016). Because climate change is both local and global in scope, engages many competing stakeholders and involves a multitude of uncertainties, it may be the most intractable problem that the world has ever faced (Lazarus, 2010). In fact, a number of scholars have ominously labeled climate change a “wicked problem” that presents a global social dilemma devoid of obvious solutions (see Levin, 2009; Turnpenny, Lorenzoni, & Jones, 2009). Climate change is not only a wicked problem but can be expanded to a global social dilemma (Chapstick, 2013).

According to Van Lange, Joireman, Parks, and Van Dijk (2013), social dilemmas are conflicts between immediate interest of individuals and the long-term interests of the collective group. The relationship of climate change to transportation provides one example of how this issue generates a social dilemma. An individual may choose to drive their gasoline-powered vehicle to work every day because he or she considers it to be more convenient and comfortable than public transit or biking. In the short run, driving a car may well be in the individual’s best interest. Nevertheless, in the long run, emissions from driving gasoline vehicles adds to greenhouse gases and exacerbates climate change, which is not in the world’s collective interest. Moreover, even if the production of greenhouse gases is insignificant, the aggregation of individual emissions can have a substantial impact on the Earth’s climate (Chapstick, 2013). Unlike other actions, however, which have clear and visible environmental impacts, such as clear cutting a forest, impacts of greenhouse gas emissions from other actions can be elusive and hard for individuals to connect their actions to these climate consequences.
Basic research, conducted by physical scientists, is essential for devising effective strategies to mitigate greenhouse gasses. But that’s only half the battle. Equally important is research conducted by social scientists to uncover how individual and societal beliefs, attitudes, and behaviors impact emission levels. In their research on why nations respond to climate change differently, Tjernström and Tietenberg (2007) found that individual attitudes about environmental protection not only directly impact greenhouse gas emissions on a daily basis but also help to shape national environmental policies over the long-term. This is especially true in democratic states since environmental policies are intimately linked to the functioning and well-being of society. Individual lifestyles, as reflected through voting, thus become an important issue to consider when addressing climate change.

When it comes to greenhouse gas emissions, personal attitudes and behavior are particularly important factors in the United States. This is particularly salient regarding food consumption behaviors; in which consumption often comprises between 10% to 30% of the household emissions produced, depending on the household income (Jones & Kammen, 2011). Within Oregon¹, among the sixteen household commodity consumption categories² identified by the Oregon Department of Environmental Quality (DEQ), food and beverage consumption yields the third highest household GHG emissions (DEQ, 2016). Within this food commodity category, red meat (which includes beef, pork, lamb, and other ruminant animals) and dairy and egg products generate the largest amount of emissions (Stehfest et al., 2009; Stockholm Environment Institute, 2011).³ In addition to meat consumption, wasting edible food also increases GHG emissions because of the unnecessary consumption of fresh water and petroleum products.

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¹ The state of Oregon was specifically looked at because my study sample is made up of Oregonians households.
²The 16 categories of household consumption range from vehicle parts, water/wastewater, services, healthcare, to any other goods/services consumed by the household.
³The dietary needs and how ruminant animals stomachs are configured are the main reasons for these high GHG emissions levels (Stockholm Environment Institute, 2011).
Research has found that food waste has steadily increased since 1974. In 2003, it totaled 1400 kcal per person per day\(^4\) (Hall, Guo, Dore, & Chow, 2009). In Oregon, GHG emissions produced from the consumption of food is 30 times greater than emissions created from the disposal of wasted uneaten food (primarily landfilled) (Stockholm Environment Institute, 2011). The reason for such a difference is that energy and water used to produce food along with transportation to retail markets are factored into the calculation of GHG emissions. Therefore, managing food production at its source can have a significant impact in reducing emission and mitigating climate change.

The purpose of this thesis is to examine what situational and social-cognitive factors affect Oregon household ecological food consumption behaviors beyond belief that climate change will cause dramatic and long-term changes in the United States. Specifically, I examine food consumption behaviors that are performed in daily life, such as purchasing less meat products, paying attention to how and where food is produced, and reducing food waste within the household. These behaviors are important to consider when looking at climate change because of their influence on greenhouse gases and community resilience. This study applies Fishbein and Ajzen’s (2010) reasoned action approach as a theoretical framework. Based on the reasoned action approach (RAA) and other relevant literature, I expect when holding attitudes towards climate change constant, four primary factors involving efficacy, means, information, and access will become important indicators in determining pro-ecological food consumption behavior.

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\(^4\) kcal reference to kilocalories- a unit of energy of 1,000 calories (equal to 1 large calorie). In the USA, kcal is synonymous with Calories. Depending on gender and age, in general, adults should be consuming 1,600 - 2,800 calories per day (NIH, 2013).
Subsequent sections of this paper explore the social–psychological frameworks commonly used to understand the relationship between individual cognitive factors and behavior. I then survey the literature concerned with the key determinants of ecological behavior. The section on methodology describes my data collection strategy and the analytical techniques. The results sections explains the OLS outputs. The discussion and concluding section outlines the validity of the hypotheses, study’s policy implications, study limitations and possible future research directions.

LITERATURE REVIEW:

Social–Psychological Frameworks

Research into the relationship between individual cognitive forces and human behavior has predominantly been conducted by social psychologists (Eagly & Chaiken, 1993). Since the 1920s, researchers have been working on the theoretical growth of attitude theory. In addition, research on the relationship between attitudes and behavior can be seen far back as the 1930s (see LaPiere, 1934; Allport, 1935). However, just as the theoretical frameworks and research into this relationship were emerging, so were the disagreements on how much weight we can assign attitudes in determining behavior. For instance, certain social situational variables may act as obstacles that hinder attitudes-consistent behavior, thus clouding the true relationship (Eagly & Chaiken, 1993). Campbell’s (1963) research on negative attitudes towards minorities found that barriers such as norms of tolerance and politeness constrained individuals from expressing their negative attitudes. Campbell (1963) concluded that social norms and other situational obstacles could create thresholds for displaying attitudes. What follows is an examination of key social-
psychological frameworks that convey different concepts of how social-cognitive factors influence pro-environmental behavior.

Schwartz's Moral Norm-Activation Theory

The Moral Norm-Activation Theory (MN-A) holds that the feeling of altruism is motivated by one’s interval values, personal norms and the intention to assist others (Schwartz, 1977). The model contains three types of variables used to predict prosocial behavior. The first are personal norms (PN) defined as the self-expectations constructed by an individual which guides them on how to behave in certain circumstances (Schwartz, 1977). These personal norms are influential when they are activated by two other variables, awareness of consequences (AC) of events for others and ascription of responsibility (AR) where the belief that one’s own actions could be responsible for the negative consequences of not acting pro-socially (Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Nolan & Schultz, 2015). With regards to environmentalism, others could translate to the awareness of consequences to non-human species and the biosphere (Stern, Dietz, & Kalof, 1993; Stern & Dietz, 1994). In employing this theory within an environmental setting, two types of interpretations are commonly used: the model as a moderator and as a mediator (De Groot & Steg, 2009).

In a study examining whether the respect of another’s health correlates with actions to not burn yard or garden wastes, Van Liere and Dunlap (1978) indicated that AR was significantly associated with burning behavior, whereas AC showed a weak association with burning. In a meta-analysis examining how researchers employed the MN-A theory on a range of prosocial intentions and behaviors, De Root and Steg (2009) found that the mediator model was supported within research looking at social and environmental contexts. Their results are in line with other research that showed awareness of consequences (AC) affects ascription of responsibility (AR)
and that responsibility indirectly affects intentions and behavior via personal norms (PN) (De Ruyer & Wetzels, 2000; Steg, Dreijerink, & Abrahamse, 2005). Lastly, others have argued that often the MN-A model neglects behavioral influences from an individual’s perceived belief about others’ pro-environmental behavior ((Blamey, 1998).

*Value-Belief-Norm Theory*

Stern et al. (1999), building on past theories and explanatory variables, developed the Value-Belief-Norm (VBN) theory to explain non-activist environmental behavior. This theory connects value theory, Schwartz’s norm-activation theory, and Dunlap and Van Liere’s Revised-NEP perspective (Stern, Dietz, & Guagnano, 1995). In this model, the cognitive link moves from more stable fundamentals of personality and belief structures to more focused beliefs about the human-behavior connections (Stern, 2000b). In research applying the VBN theory, Steg, Dreijerink, and Abrahamse (2005) were able to confirm this cognitive link. In addition, Thøgersen and Grunert-Beckmann (1997) looking at waste minimizing behavior were able to establish a value-attitude-behavior hierarchy.

Research utilizing the VBN model along with analyzing contextual factors to understand pro-environmental behavior within business organizations found mixed results, in that only perceived commitment to sustainability was significant in the VBN’s causal chain (Andersson, Shivaranjan, & Blau, 2005). Other studies have compared the VBN model to the theory of planned behavior. These studies have found that the theory of planned behavior has a more statistical significant fit statistics and a higher proportion of explained variance (Kaiser, Hübner, & Bogner, 2005; López-Mosquera & Sánchez, 2012).
Theory of Planned Behavior

For over 45 years, Fishbein and Ajzen (2010) have been modifying their theoretical frameworks in order to better understand and predict human social behavior within various applied settings. The theory of planned behavior (TPB), in the late 1980s, was derived from the theory of reasoned action in order to account for instances where people may lack complete free will over their desired behavior (Fishbein & Ajzen, 2010). The TPB hypothesizes that the intention to perform a behavior is determined by attitudes towards the behavior, subjective norms towards the behavior, and perceived behavior control (the belief one can perform the behavior) (Ajzen, 1991).

In the application of the theory of planned behavior, Han, Hsu, and Sheu (2009) investigated customers’ intention to visit green hotels. Their results showed that the TPB framework was robust and predicted attitudes, subjective norms, and perceived behavioral controls, all of which positively affected the intention to stay at a green hotel. However, other researcher have found mixed results when applying the TPB. In a study conducted by Cheung, Chan, and Wong (1999), they found that the TPB significantly predicted both behavioral intentions and self-reported pro-environmental behavior, while perceived control had no significant effect.

A criticism of the TPB is that it does not incorporate emotional factors such as threat, fear, and mood within the framework (Dutta-Bergman, 2005) nor does it give an explanation of how past behavior or habits influence future actions (Knussen, Yule, MacKenzie, & Wells, 2004). Furthermore, habits and past behavior are essential factors to take into account when attempting to understand pro-environmental behavior (Reid, Sutton, & Hunter, 2010). Ajzen and Manstead (2007) uphold the predictive power of the TPB and make a case that habitual and past
behavior factors are accounted for within the behavioral and normative aspects of the theory. Regardless of possible limitations, the TPB continues to be one of the frameworks of choice within the pro-environmental literature (Reid, Sutton, & Hunter, 2010).

**Reason Action Approach**

Recent theory has predicted and understood human social behavior via the reasoned action approach (RAA) framework (Fishbein & Ajzen, 2010). This framework was built upon their previous theories including the theory of planned behavior. The RAA purports that in order to elicit a behavioral response several explanatory variables need to be activated. In addition, the RAA does not assume rationality and it encompasses both deliberative and spontaneous decision making. Fishbein and Ajzen, (2010) argue that individuals approach different kinds of behavior in similar manners and that the same limited set of explanatory constructs can be applied to predict and understand any behavior of interest. Fishbein and Ajzen (2010) have developed a flow chart that illustrates their framework, which is shown below in diagram 1.

Within the diagram, the starting point in developing a behavior begins with an individual’s background factors. These factors include, demographics, individual differences (such as personality), knowledge, and social structure variables. These background factors simultaneously influence a person’s behavioral beliefs (outcome expectancies about the action), normative beliefs (how one believes he/she should be expected to act ), and control beliefs (self-efficacy). Once these three attitudes have been activated, they interact with attitudes towards the given behavior, perceived norms (social pressure that one would perceive to experience if she/he acts or not), or perceived behavior control (perceptions of the ability to perform a given behavior). When attitudes, perceived norms, and perceived behavioral controls are formed, the
combination of these three can lead to the development of behavioral intention or readiness to perform the behavior. (Fishbein & Ajzen, 2010).

**Diagram 1:** Reasoned Action Approach - Fishbein and Ajzen (2010)

Within my study, I used a modified RAA as my theoretical foundation. Modifying the RAA framework allowed for a better explanation of my data. Diagram 2 provides a schematic of this modified version. Within this modified framework, I focus on a selected amount of background factors that are found in the literature to influence behavior. These factors are held constant throughout my study. Next, the attitudes towards behavior variable has been adapted to measure the individual’s general belief about the impacts of climate change. These attitudes towards climate change are held constant within my study. The social-situational and behavioral beliefs factors are the factors of interest that my study aims to investigate. Because I want to test if these factors have a more direct relationship to behavior, I have positioned them differently than what would be found in the originally RAA model. The behavioral beliefs factor has been
operationalized to measure an individual’s general perceived self-efficacy towards their ability to make a pro-environmental impact through their own actions. Once the social-situational and behavioral belief factors have been activated, an individual has an intention to act and therefore more than likely to engage in the behavior. The arrows in diagram 2 shows a causal link starting with background factors and ending with food consumption behavior.

**Diagram 2:** Modified Reasoned Action Approach

*Research examining the Reasoned Action Approach*

In order to understand how these variables impact behavior, several studies have reviewed the validity of these relationships. Webb and Sheeran (2006) investigated how changes in behavioral intention related to behavior change. They found that medium to large changes in intention correlated to a small to medium change in behavior. In addition, they also found that intentions have a reduced impact on behavior if there is a lack of control over that behavior, if the behavior is a habit, and on risky behaviors performed in social contexts Webb and Sheeran (2006). As professed by Ajzen (2002), routinization of behavior aligns with a reasoned action perspective. Other research has suggested that there is a gender-behavioral intention relationship
where females have stronger held beliefs towards environmental protection, thus are more willing to perform pro-environmental behaviors (Stern and Dietz, 1994).

**What Factors influence Ecological Behaviors**

In addition to cognitive determinants, others have argued that situational, demographic, and socioeconomic factors can also exert an influence on behavior (Corraliza & Berenguer, 2000). Others stress equal attention should be employed to both types of variables in order to have the most complete analysis (Van Liere & Dunlap, 1980). In this section, to develop a more comprehensive understanding of the factors that impact the decision to act, I will be looking at both types of behavioral determinants.

**Attitude-Behavior Gap**

The Attitude-behavior gap refers to a discrepancy between evaluative views an individual holds and a specific behavior the individual performs (Stern, 2000b). Research into the relationship between attitudes and behavior has been investigated some time. For instance, Wicker (1969) concluded that attitudes are not a strong gauge of ecological preservation behavior, but have been considered significant predictors. Pro-environmental or environmentally significant behavior can be defined as behavior that will bring about positive impacts on the biosphere (Stern, 2000b). Academic research into the attitude-behavior relationship has primarily split into two concentrations. One application evaluates how differences in measurement of attitudes and behaviors affect the validity of the relationship. The other concentration examines how other factors may be driving the attitudinal-behavioral gap.

In evaluating attitudinal and behavioral measurements, research by Sjöberg (1982) and Werner (1978) found that relatively strong attitude-behavior relationships can be produced by
relating a general attitude (such as environmental sustainability) to a dependable behavioral index, which is created by combining attitude-relevant behaviors. Tarrant and Cordell (1997) have identified three reasons for an absence of correlation between attitude and behavior; (1) lack of precise attitudinal and behavioral measurements; (2) lack of attitudinal measurement quality; (3) and a failure to take into account the influence of external factors.

Wall (1995) concluded that context maybe the driving force influencing the disagreement between one’s environmental concern and their behavior. For example, behavior may be nothing more than a convenient way to act. Furthermore, Vermeir and Verbeke’s (2006) also highlight that there is more to influencing behavior than attitudes. Their study looked at the potential gap between positive attitudes towards ecological behavior and the behavioral intentions in purchasing sustainable food products. They uncovered that the reason why there was a disconnect between stated attitudes and corresponding stated behavioral intentions was due to the perceived lack of available ecological products. This mediating variable, perceived lack of availably, helped explain why intentions were low even when attitudes towards a behavior are positive. More recent research has also confirmed that not only does environmental concern influence water conservation behavior (which demonstrates an attitude-behavior consistency relationship) but socio-demographic variables, age and income, also produce a statistically significant impact on behavior, in the case of this study water consumption behavior (Wolters, 2012).

**Behavioral Beliefs**

Within the literature that focuses on the attitude-behavior relationship, behavioral beliefs have been identified as a key cognitive determinant. There are several different terms used to understand this determinant; nonetheless, they all communicate the same meaning. Some
researchers simply use the term behavioral beliefs; which are ideas individuals hold about negative or positive consequences they will experience from performing a behavior. These are outcome expectancies and these expectancies form an individual’s attitude to performing a behavior (Fishbein & Ajzen, 2010). In evaluating the impact of behavioral belief on behavior, Tobler, Visschers, and Siegrist (2011) determined that consumers’ motivation to take up ecological food consumption actions followed their belief that these behaviors would cause environmental benefits. Similarly, increasing perceived consumer effectiveness, the extent that a consumer believes their purchases make a difference, can elicit consumers to convey their environmental concerns through pro-environmental behavior (Ellen, Wiener, & Cobb-Walgren, 1991).

Another way to understand how behavioral belief can influence action is by observing an individual’s locus of control. The term locus of control is a measure of how an individual perceives a reward or reinforcement that is conditional upon their behavior (Rotter, 1966). In researching how ecological concern influences a consumer’s intention to purchase eco-friendly packaged products, Schwepker Jr. and Cornwell (1991) concluded that individuals with a locus of control, who were concerned about litter, and believed pollution was a pressing problem were more likely to purchase ecologically packaged products.

In addition, others evaluate why an individual acts through the notion of perceived self-efficacy. This term simply means that in order for an individual to act on their attitudes they must perceive that they have the capacity to produce a desired effect (Bandura, 1994). Research uncovering main antecedents of green purchase behavior found that individual’s positive beliefs about self-efficacy mediated the relationship between the individual’s value orientation on general ecology concern and their tendency to purchase green products (Kim & Choi, 2005). In
addition, Barr, Gilg, and Ford (2001) have shown that high levels of self-efficacy, specifically the belief that a specific action will have an evident impact on the environment, has a significant impact on environmental commitment.

**Means**

Means within this paper refers to the financial ability to purchase pro-environmental produced food and the capability to invest time in ecological food consumption behaviors. There are mixed results within the literature as to whether household income influences environmental behavior. A study conducted by Wandel and Bugge (1997) showed that purchasing ecologically produced food was not related to a customer’s social-economic situation. Others found inconsistent results on how much income may influence behavior (Jones & Dunlap, 1992; Van Liere & Dunlap, 1980). In regards to the relationship between food consumption and income, Gossard and York (2003) found that beef consumption was positively related to income level; which may be due to the price of beef compared to other food products. Conversely, other research has shown income to influence environmental behavior in part due to individuals having more resources to carry out ecological efforts (Buttel, 1975; Clark, Kotchen, & Moore, 2003).

Time has also been shown to influence the engagement in ecological behavior. Within this notion, ecological behaviors can be viewed as time investments in the environment (Reisch, 2001). For example, in order to purchase ecologically produced food it takes time to research and be informed to make that decision. Blake (1999) has noted that individuals who have satisfied their human needs are more likely to engage in ecological behavior because they have greater resources such as time, money, and energy. Within this same vein of thought, other research has examined the notion of “downshifting”, which illustrates the actions of working less and increasing leisure time in an effort to reduce stress and improve one’s quality of life (Drake
2001). Other researchers have viewed “downshifting” as a means to bring about positive environmental impacts (see Hayden, 2001; Thomas, 2008) through increased mindfulness (Brown & Kasser, 2004) by having more leisure time and subsequently reducing consumption. There have been other studies, however, that have demonstrated that work-status did not influence the likelihood of purchasing ecologically produced food (Wandel, 1997) nor willingness to pay higher prices for ecologically safe products (Laroche, Bergeron, & Barbaro-Forleo, 2001).

**Access**

Access defines the ability for individuals to obtain the desired goods and services that are needed in order to complete an action. For example, if an individual believes that purchasing ecologically produced food is good for the environment, however is only able to purchase non-ecologically products, their attitudes and behavior will not be consistent. Evaluating access frequently involves determining where an individual lives. For instance, living in a rural or urban community can place different situational constrains on food availability (Morton, Bitto, Oakland, & Sand, 2008). An example of situational constraint is food spatial disparity; which entails long stretches of land where communities are without adequate nutritional food selections. This phenomena has primarily been studied in low-income urban areas (Sharkey, 2009). However, other research has found spatial disparity among rural communities (Dean and Sharkey (2011). These disparities are primarily a function of the great distances traveled and the types of transportation available to rural communities (Wrigley, Warm, Margetts, & Whelan, 2002). The available food found in rural communities is mainly located in small stores that have less available brands and alternatives than the food available in the larger grocery stores located mainly in urban settings (Smith & Morton, 2009).
Another way to view food access is through the concept of redistribution and reciprocity. These are two noneconomic methods used to help individuals who are not able to meet their food resource needs in a market economy (Lomnitz, 2002). If low-income households are still not able to meet their food needs via redistribution, which is largely employed by governments and charities, they may turn to reciprocity (Morton et al., 2008). Research has found that reciprocal nonmarket food exchange happens more often within rural low-income communities than in low-income urban counterparts. For instance, rural households were able to obtain food such as meat, fish, and vegetables from family, friends, and neighbors compared to urban households. In addition, these low-income rural households were also able to acquire these food products from local farms (Morton et al., 2008). Furthermore, comparing meat intake for rural and urban communities, Gossard and York (2003) found that urban residents eat less beef than rural residents; however, there was not a statistically significant difference among urban and rural residences when measuring the consumption of total meat (which includes beef, pork, poultry, seafood, and processed meats).

**Information**

Environmental knowledge is frequently considered a way to overcome misinformation and ignorance and considered a precursor to ecological behavior (Gardner & Stern, 2002). An indicator that has been used in the literature to measure how individuals retain and process information and thus to gauge one’s knowledge on a subject is by surveying formal education attainment. The judgment behind using education as a proxy to measure knowledge is that better educated individuals are more practiced at learning and more skillful at organizing and gathering key information (Price & Zaller, 1993). Interesting enough, Jerit, Barabas, and Bolsen (2006) research exploring the determinants of political knowledge found that the relationship between
education and knowledge varies according to how information is disseminated. They outline that there is a positive relationship with increased newspaper coverage of a political topic and highly educated individual’s knowledge, supporting the education-knowledge relationship. However, they also discover a positive relationship among increased television converge on the political topic and increase knowledge of the less educated, refuting the education-knowledge relationship.

Some researchers have found that higher educated individuals convey stronger concerns towards the environmental compared to less educated individuals (Howell & Laska, 1992; Jones & Dunlap, 1992; Van Liere & Dunlap, 1980). Others have shown that education can have a positive influence on concern and behavioral commitment (see Schultz, 2002; Johnson, Bowker, & Cordell, 2004; Casey & Scott, 2006). Particularly looking at ecological impacts of meat consumption, Gossard and York (2003) found that education is negatively related to beef and total meat consumption. However, others have concluded that information does not influence behavior (Stern, 2000a; Frick, Kaiser, & Wilson, 2004).

Values and Social-Demographic Variables

Values

Political ideology is another variable that has repeatedly been discussed in the literature on environmental attitude formation and pro-environmental behavior. Recent decades have seen strong polarization on environmental issues. Where liberals proclaim strong concern for the environment, conservatives are generally opposed to introducing environmental protections (Feygina, Jost, & Goldsmith, 2010; McCright & Dunlap, 2011). Environmental behaviors has been shown to significantly differ along political ideological lines (Dunlap, Xiao, & McCright, 2001; McCright & Dunlap, 2011). Research in line with the above results illustrates that liberals
were significantly more likely than conservatives to indicate a committed to environmental protection and to perform ecological behavior (Steel, 1996). However, there has been other research that has indicated no significant differences between pro-environmental behaviors across supporters of various political parties (Casey & Scott, 2006).

In addition to how political ideology values effect behavior, other research has sought to develop a means to measure an individual’s ecological worldview, or primitive beliefs, in how humans relate to nature. This measurement, called the new ecological paradigm scale (revised-NEP) developed by Dunlap and Van Liere (1978, 1984) and Dunlap et al. (2000) is a 15-item scale which ranges from a worldview holding anthropocentric values (viewing humans as dominant over nature) to a worldview consisting of biocentric values (viewing humans and nature as equal). Research has predominantly shown the revised-NEP as a reliable predictor of pro-environmental concern and behavior. In Clark, Kotchen, and Moore’s (2003) study examining factors that influence participation in a household renewable energy program, found that both participants and non-participants indicated positive attitudes towards the environmental; however, mean responses for the revised-NEP were higher among the participants. Their analysis further pointed to a positive relationship among the revised-NEP score and the probability of participating in renewable energy programs. The frequency an individual engages in recycling, ecological consumption, or conservation behaviors has also been shown to be positively associated with levels of biocentric values (Casey & Scott, 2006). The revised-NEP has also been shown to be a significant predictor in determining ecological behavior (Davis, Le, & Coy, 2011). Criticism towards the revised-NEP scale has primarily come from how it's administered. Studies that have used a 6-item version of the NEP scale showed higher scores compared to studies using the 15-item NEP Scale. The authors warn that variations
in how the NEP scales are used could affect the accuracy in measuring environmental attitudes (Hawcroft & Milfont, 2010).

Social-Demographics

Children in the household may also influence adult ecological attitudes and behaviors. Xiao and McCright (2012) evaluated how parenthood could affect gender differences with regard to concern about environmental issues within the United States. Their research determined that parenthood did not have a significant effect on concern. Similarly, Wandel and Bugge (1997) found that individual’s desire to consume ecologically produced food was not related to the presence of children in the household. Other research was not able to determine whether children impacted a parent’s pro-environmental beliefs (Torgler, Garcia-Valiñas, & Macintyre, 2008).

Lastly, other research has focused on how the number of individuals in a household influences environmental behavior. Clark, Kotchen, and Moore’s (2003) find that more individuals in a household decreases the amount of disposal income even after controlling for differences in household income. As a result, the implication is that household size may impact pro-environmental behavior, which is monetary-based.

Gender’s impact on environmental behavior has also been discussed in the literature. It has been shown that women exhibit greater concern for the environment and engage in pro-environmental behavior more than men; however, when examining specific behaviors this may not be the case. For example, a number of studies have demonstrated a positive relationship between gender and environmental concern (Jones & Dunlap, 1992; Steel, 1996; Tindall, Davies, & Mauboules, 2003; Zelezny, Chua, & Aldrich, 2000). Casey and Scott ‘s (2006) found that women are more concerned for the environment and indicate a higher engagement of pro-environmental behaviors than men. Women are also found to engage in pro-environmental
behavior such as recycling more frequently than men (Johnson, Bowker, & Cordell, 2004). On the other hand, Tobler, Visschers, & Siegrist (2011) found in regards to meat consumption that men were more likely to reduce their meat consumption for environmental reasons where females were more likely to reduce meat for health reasons. In addition, men are more likely to eat meat (see Guenther, Jensen, Batres-Marquez, & Chen, 2005; Jensen & Holm, 1999) and have a greater revealed preference for it than women (Kubberød, Ueland, Rød botten, Westad, & Risvik, 2002).

The impact of age on environmental concern or pro-environmental behavior, is more disputed in the literature. Some have noted a negative relationship between age and environmental concerns (Arcury, 1990; Dunlap et al., 2000; Jones & Dunlap, 1992). However, other research has found a positive correlation between age and environmental conservation (Olli, Grenstad, & Wollebaek, 2001). Research examining the relationship between recycling behavior and age found that age was not a significant predictor of behavior (Schultz, Oskamp, & Mainieri, 1995). Contrary to the above findings, Casey and Scott’s (2006) analysis confirmed a positive association between age and both increase levels of ecological concern and engagement in ecological behaviors as recycling, consumption, and conversing. Wolters’ (2012) also discovered a highly significant positive correlation between age and water conservation practices. Other studies have focused on the theoretical explanation of how age may affect ecological behavior. Otto and Kaiser (2014) found that learning rather than aging accounted for the relationship between age and self-reported ecological behavior. Lastly, in viewing age as a control variable for changes in dietary requirements, Gossard and York (2003) found that people eat both less total meat and beef as they grow older.
Based on the above literature review concerning factors that have the potential to influence ecological behavior, I pose the four below hypotheses.

**Hypotheses**

Recognizing an attitude-behavior gap related to attitudes towards climate change impacts and pro-ecological food consumption behavior, I hypothesize that four primary factors influence this gap.

**H**\textsubscript{1}: Behavioral Belief: If an individual believes that their behavior will bring about a positive environmental change, they will be more likely to undertake pro-ecological food consumption behaviors.

**H**\textsubscript{2}: Means: As an individual’s income increases, they will be more likely to undertake pro-ecological food consumption behaviors. In addition, individuals who have more available leisure time will be more likely to undertake pro-ecological food consumption behaviors.

**H**\textsubscript{3}: Information: As an individual’s level of education increases, they will be more likely to undertake pro-ecological food consumption behaviors.

**H**\textsubscript{4}: Access: Individuals living in urban areas compared to rural areas are more likely to have access to greater food variety and undertake pro-ecological food consumption behaviors.

**Definitions**

Within social-cognitive literature, the below terms have often been used interchangeably which can create confusion (Rokeach, 1968; Schultz, Shriver, Tabanico, & Khazian, 2004). What follows are the definition that I have employed in this study.

I use the term *Belief* to refer to inferences made by an individual about principal conditions of expectation (Rokeach, 1968). For example, I believe commuting by bike will
reduce global warming. Beliefs are not necessarily based in fact. There are many types of beliefs that make up one’s belief system (Rokeach, 1968). An environment concern is the affect related to a belief an individual has about an environmental problem (Schultz et al., 2004). In continuing with the former example, I am concerned how the environment will be negatively impacted by car emissions; therefore I will ride my bike.

Within our belief system are values, these are a set of beliefs which function as guiding standards or moral principles (Dietz, Fitzgerald, & Shwom, 2005). These values go beyond specific actions or situations one may find themselves in. Values are also ordered by their importance; where this feature differentiates them from norms and attitudes (Schwartz, 2012). Examples of values include equality, respect, and freedom. Moreover, environmental values refer to values that specifically connect to nature (Schultz et al., 2004). For the term worldview, I am referring to Dunlap and Van Liere’s (1978) environmental paradigm that is the portion of an individual’s belief system encompassing beliefs about humanity’s relationship with nature.

*Attitude* refers to an evaluative view an individual holds about a certain object or situation. Attitudes are frequently expressed in a negative or positive preference (Eagly & Chaiken, 1993). For example, “I support an increase in my property tax to fund building more bike paths.”

**VARIABLE SELECTION AND EMPIRICAL MODEL:**

Data used in this paper stems from the 2015-2016 Oregon Lifestyle Surveys. This research project was fashioned from a partner project conducted by the Consensus Sustainability Project, funded by the Environmental Protection Agency of Ireland (Consensus.ie, 2014). The objective of the Consensus Project was “to gain an understanding of people’s attitudes and
behaviors towards sustainable household consumption and sustainable lifestyles” (Consensus.ie, 2014). The Oregon Lifestyle Survey Project concentrated on five major areas of study, four areas based on the Irish Consensus Project and one unique to the Oregon project. These five areas of study include: individuals’ energy behavior, mobility, food consumption, water consumption, and consumerism.

Methods in gathering my data included the distribution of three waves of the Oregon Lifestyle Survey by mail to a random sample of Oregon households. A modified version of Dillman’s (2000) “Total Design Method” was employed for the survey design and implementation. Names and addresses were provided by a national survey research company that has comprehensive lists of public directories. In spring of 2015, two survey waves were sent to 2,200 randomly selected households. Two types of surveys (A & B) were sent out during both wave one and wave two. Survey A focused on behaviors related to energy and consumerism. Survey B focused on mobility, food, and water. From the 697 total surveys retuned, 374 were survey A and 323 were survey B. The response rate for survey A and B combined was calculated at 36%. This paper uses data from survey B. The primary reason for this is my interest in the attitude-behavior relationship involving food consuming actions which was included in survey B.

Of the 323 (survey B) surveys returned, approximately 15% were from rural residents and approximately 85% were from urban residents. Due to the rural sample size not being representative of the rural population (according to the 2010 Oregon census population, Oregon’s rural population is larger than 15% of the total population - Population Research Center, 2014), an additional wave of survey B was administered in a similar manner mailed to 700 randomly selected rural Oregon residential households in spring of 2016. However, this third wave of survey B was a condensed version; which this version will be called survey C.
Investigating my research question did not require all of the data that was in survey B; therefore survey C was used. Survey C yielded a response rate of 18%. In order to produce a representative sample of Oregon households for my research, I aggregated the results from the questions that were present in both survey B and survey C\(^5\). This yielded a sample size of 440 households and a rural-urban split of 32% rural and 68% urban.

In order to use the above survey data to determine what factors influence an attitude-behavior gap, I choose to hold attitudes towards climate change constant and examined whether ecological food consumption behavior varied. If there is variation, this would indicate a gap. This was accomplished by creating a subsample of all the respondents who indicated they believe climate change will cause dramatic and long-term changes to the United States. This group consisted of 258 respondents (59% of the total sample). Graph 1 highlights that there is indeed variation of food consumption behavior amongst those that believe that climate change will have long-term consequences; therefore, showing a gap. Referring to the x-axis in the graph of Graph 1, ecological food consumption behavior was measured on a standardized index where an index measure of 0 indicates an individual lies perfectly at the mean. As shown in Graph 1, this variation in behavior ranges from index score -9 to index score +4. In sum, though all of the individuals in my subsample believe climate change will cause dramatic and long-term changes to the U.S., there is an inconsistency within the group in regards to the commitment to act.

\(^5\) A copy of Survey C is located in the Appendix D.
I then used the subsample to test my hypothesized factors that may influence an ecological attitude-behavior gap. I conducted a cross-sectional study employing the ordinary least squares (OLS) estimator to analyze how my primary explanatory factors influence food consumption behavior amongst individuals who believe that climate change will have dramatic long-term consequences. I selected ecological food consumption behavior as the primary dependant variable of interest. Three lifestyle indicator survey questions were used to operationalize respondent’s ecological food consumption behavior. This behavioral measurement was developed by standardizing the respondent’s responses to the three questions initially measured in a 5-point Likert scale. The questions include: “I pay attention to where and how the food I buy is produced”; “I try to avoid eating meat as much as possible”; and “I try to reduce the amount of food waste that my household produces.” Looking particularly at question three, food waste refers to food discarded at the end of the food line (from farm to table). The standardized responses from each respondent were then added to develop a behavior index. An

**Graph 1:** Frequency of Food Consumption Behavior Index
index measure of 0 indicates an individual lies perfectly at the mean. Individuals who have an index value above zero are more likely to engage in ecological food consumption behavior compared to the group average. Similarly, individuals who have an index value below zero are less likely to engage in these behaviors compared to the group average.

I selected five explanatory variables of interest, which literature has shown to have an impact on food consumption behaviors. The first indicator is a behavioral belief variable. This variable measures the level of agreeability on a 5-point Likert scale as to whether a respondent feels that their, “own personal behavior can bring about positive environmental change.”

Household income is the second indicator. The means to purchase ecologically friendly food options tend to be more expensive. Therefore, I have included dummy variables that account for household income. These variables represent three income groupings: income less than $25,000 (baseline dummy), income equal to $25,000 but less than $75,000, and income equal to and greater than $75,000. Time an individual has in a day may also affect their ecological behavior. Because a measure of leisure time was not in the survey, I used work status as a proxy for an individual’s time that they can spend on ecological food consumption behavior. In this case, the less someone works, the more time they may have to devote to ecological behavior. I created four proxy categorical dummy variables for the time variable: employed full-time and self-employed (baseline dummy), employed part-time, retired, and a dummy category that combines unemployment, student, and other employment status such as not working outside home.

For the proxy variable of environmental knowledge I used level of education attainment. This is measured as a categorical dummy where individuals were grouped according to attaining a high school diploma (baseline dummy), undergraduate degree, or graduate degree. Lastly, the
explanatory variable food access was measured by means of a binary variable describing the rural/urban location of a household. This variable was developed using the 2013 official Office of Management and Budget (OMB) rural-urban continuum codes for determining rural and urban locations (USDA-ERS, 2013). This rural-urban classification differentiates metropolitan counties by the population size of their metro area, and nonmetropolitan counties by degree of urbanization and adjacency to a metro area. The USDA-ERS (2013) continuum code range from 1 (most metropolitan) to 12 (least metropolitan). To create a more even distribution between rural and urban residence, I combined counties who have a score between 3 to 12 into the rural category and scores 1 and 2 are considered urban (metropolitan). Once the sample was aggregated into either rural or urban, I recoded the scores to reflect a binary distinction, where 0 = rural and 1 = urban. My empirical model can be summarized as follows:

\[
\text{FoodBxIndex}_i = \beta_0 + \beta_1 \text{Bx_belief}_i + \beta_2 \text{Income}_i + \beta_3 \text{Work Status}_i + \beta_4 \text{Education}_i + \beta_5 \text{Access}_i \\
+ \sum \beta_k X_{k,i} + \sum \beta_m Y_{m,i} + \sum \beta_n Z_{n,i} + \epsilon_i
\]

Vector \( \Sigma \beta_k X_{k,i} \) includes all of the value variables: political ideology and revised-NEP.

Vector \( \Sigma \beta_m Y_{m,i} \) includes the demographic variables: gender and age.

Vector \( \Sigma \beta_n Z_{n,i} \) includes the situational variables: number of children in the household.

Variables that I controlled for in this study are as followed. The Revised-New Ecological Paradigm (revised-NEP) scale is used to measure an individual’s world-view on the relationship between humans and environment by evaluating an individual’s level of agreement concerning

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6 Definitions of each score are located in Appendix A.
statements regarding equality between humans and nature and the environment’s sensitivity to human actions Dunlap et al. (2000). Therefore, the more items an individual supports on the revised-NEP scale, the more concerned they have for the environment. Within this research, I employ an abbreviated 6-question version\(^7\) of the full 15-question scale (see other research that has employed modified versions, i.e. Clark, 2002; Cordano, Welcomer, & Scherer, 2003; Wolters, 2012). This abbreviated version allowed me to maintain a user-friendly survey length. Scores range from a high of 30, indicating viewing the world with a pro-ecological stance, to a low of 6, indicating viewing the world with weak ecological concern. The variable ideology is measured on a scale from 1 to 5, where 1 indicates that someone is very liberal, 2 indicates that they are liberal, 3 indicates they are moderate, 4 indicates they are conservative, and 5 indicates they are very conservative. In addition, I include: gender; a binary variable, 1 = female and 0 = male; age in years measured continuously; and number of kids still living at home as a continuous variable. All of my variables and how they are measured are detailed in Table 1.

\(^7\) Description of constructing the abbreviated version is located in the Appendix B.
Table 1: Description of Subsample and Variables

| Subsample: | I believe climate change…
|           | 1= Will cause dramatic and long-term changes to the United States. |

<table>
<thead>
<tr>
<th>Behavioral Dependant Variable:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Standardized Index: -X (non-environmental) to +X (pro-environmental)</td>
</tr>
<tr>
<td>Likert scale 1-5</td>
</tr>
<tr>
<td>I pay attention to where and how the food I buy is produced.</td>
</tr>
<tr>
<td>I try to avoid eating meat as much as possible.</td>
</tr>
<tr>
<td>I try to reduce the amount of food waste that my household produces.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explanatory Variables of Interest:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Belief Factor:</td>
</tr>
<tr>
<td>Behavioral Belief: Likert scale from 1 (strongly disagree) to 5 (strongly agree)</td>
</tr>
<tr>
<td>Means Factors:</td>
</tr>
<tr>
<td>Household Income Dummy: &lt;25k (baseline), 25k to &lt;75k, ≥75k</td>
</tr>
<tr>
<td>Work Status Dummy: Full-Time (baseline), Part-Time, Retired, Other/Student/Unemployed</td>
</tr>
<tr>
<td>Information Factor:</td>
</tr>
<tr>
<td>Level of Education Dummy: ≤ HS dip (baseline), College Graduate, Graduate School</td>
</tr>
<tr>
<td>Access Factor:</td>
</tr>
<tr>
<td>ERS Urban/Rural Continuum: Urban = 1, Rural = 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control Variables:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Variables:</td>
</tr>
<tr>
<td>Political Ideology: Scale from 1 (very liberal) to 5 (very conservative)</td>
</tr>
<tr>
<td>revised-NEP: Index from 6 (weak ecological concern) to 30 (strong ecological concern)</td>
</tr>
<tr>
<td>Demographic Variables:</td>
</tr>
<tr>
<td>Gender: Female=1, Male=0</td>
</tr>
<tr>
<td>Age: Continuous Variable</td>
</tr>
<tr>
<td>Situational Variables:</td>
</tr>
<tr>
<td>Kids: Continuous Variable</td>
</tr>
</tbody>
</table>

Using the above variables, I ran six series of regressions. The outputs of these regressions are found in the result’s section of this paper within table 1. The first five of these regressions each specifically test a different stated hypothesis. The first regression, the Belief model, examines the impact of behavioral belief on ecological food consumption behavior, while incorporating values, demographic, and situational control variables. Model 2, Means1, looks at how respondent’s household income influences ecological food consumption behavior, while
incorporating values, demographic, and situational control variables. Model 3, Means2, analyzes how work status influences ecological food consumption behavior, while incorporating values, demographic, and situational control variables. Model 4, info, examines the impact using the level of educational attainment as a proxy for ecological knowledge on ecological food consumption behavior, while including values, demographic, and situational control variables. Lastly, model 5, access, investigates how the level of access to food variety by means of a rural/urban proxy variable impacts ecological food consumption behavior, while including values, demographic, and situational control variables.

In order to reduce the impacts of omitted variable bias that each of the above five regressions suffered from, model 6, the full model, was used for my principal analysis. Model 6 incorporates all explanatory independent variables of interest, belief, means, info, and access, along with the values, demographic, and situational control variables. The inclusion of all explanatory variables did cause model 6 to suffer from imperfect multicollinearity\textsuperscript{8}. However, I did not exclude any correlated independent variables because the collinearity did not significantly alter the significance of the beta coefficients in model 6 nor did I want to reintroduce omitted variable bias.

\textsuperscript{8} Multicollinearity: For model 6, running a pair-wise correlation showed 4 statistically significant negative correlations between: 1) at most having a high school diploma and annual household income of more than $75,000; 2) full-time work status and retired work status; 3) having a undergraduate degree and at most having a high school diploma; 4) having a graduate degree and at most having a high school diploma.
RESULTS: 

Table 2: Results of OLS Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Belief</th>
<th>Means1</th>
<th>Means2</th>
<th>Info</th>
<th>Access</th>
<th>Full</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bx_belief</td>
<td>0.338**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.533***</td>
</tr>
<tr>
<td>Ideology</td>
<td>-0.544***</td>
<td>-0.464***</td>
<td>-0.563***</td>
<td>-0.491***</td>
<td>-0.519***</td>
<td>-0.488***</td>
</tr>
<tr>
<td>NEPindex</td>
<td>0.095**</td>
<td>0.111**</td>
<td>0.117***</td>
<td>0.102**</td>
<td>0.111***</td>
<td>0.099**</td>
</tr>
<tr>
<td>Female</td>
<td>0.715***</td>
<td>0.745***</td>
<td>0.860***</td>
<td>0.704***</td>
<td>0.791***</td>
<td>0.705**</td>
</tr>
<tr>
<td>Age</td>
<td>0.011</td>
<td>0.016</td>
<td>0.018</td>
<td>0.015</td>
<td>0.012</td>
<td>0.016</td>
</tr>
<tr>
<td>Kids</td>
<td>-0.334**</td>
<td>-0.293*</td>
<td>-0.251</td>
<td>-0.303*</td>
<td>-0.314*</td>
<td>-0.233</td>
</tr>
<tr>
<td>INC_25ku~75k</td>
<td>-0.340</td>
<td>-0.203</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INC_75kMore</td>
<td>0.090</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.612</td>
</tr>
<tr>
<td>WK_Retired</td>
<td></td>
<td>-0.390</td>
<td></td>
<td></td>
<td></td>
<td>-0.621</td>
</tr>
<tr>
<td>WK_PT</td>
<td></td>
<td>-0.689</td>
<td></td>
<td></td>
<td></td>
<td>-1.124**</td>
</tr>
<tr>
<td>WK_OtherUn-p</td>
<td></td>
<td>-1.698*</td>
<td></td>
<td></td>
<td></td>
<td>-2.408**</td>
</tr>
<tr>
<td>EDU_CollGrad</td>
<td></td>
<td>0.033</td>
<td></td>
<td></td>
<td></td>
<td>-0.140</td>
</tr>
<tr>
<td>EDU_Graduate</td>
<td></td>
<td>0.206</td>
<td></td>
<td></td>
<td></td>
<td>0.063</td>
</tr>
<tr>
<td>ersurban_i-u_con</td>
<td></td>
<td>0.188</td>
<td></td>
<td></td>
<td></td>
<td>0.398</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>210</td>
<td>202</td>
<td>204</td>
<td>208</td>
<td>211</td>
<td>194</td>
</tr>
<tr>
<td>r2</td>
<td>0.234</td>
<td>0.204</td>
<td>0.255</td>
<td>0.203</td>
<td>0.213</td>
<td>0.303</td>
</tr>
<tr>
<td>r2_a</td>
<td>0.211</td>
<td>0.176</td>
<td>0.224</td>
<td>0.175</td>
<td>0.190</td>
<td>0.248</td>
</tr>
<tr>
<td>F</td>
<td>10.327</td>
<td>7.119</td>
<td>8.326</td>
<td>7.275</td>
<td>9.200</td>
<td>5.548</td>
</tr>
</tbody>
</table>

legend: * p<.1; ** p<.05; *** p<.01

1 Baselines: >25k income Dummy; Full-Time Work Dummy; ≤ H.S. Diploma Dummy. Within Box: Control Variables.
2 Full Model (not shown in table 2): F-statistic = 0.000

Table 2 shows the beta coefficients for the individual OLS regressions performed in Stata for each independent variable of interest (behavioral belief, means, information, and access). While controlling for ideology, revised-NEP score, gender, age, and children present in household, the above regression outputs indicate that behavioral belief, income, and job status have a statistically significant (at most p < .10) influence on ecological food consumption behavior.

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9 Summary statistics of all variables used in my analysis are contained in the Appendix C.
The reminder of the results section focuses on the full model and the model’s beta coefficients that meet the statistically significant threshold of $p < .05$. Behavioral belief, which represents a respondent’s level of agreement with the statement, “I feel that my own personal behavior can bring about positive environmental change,” is statistically significant ($p < .01$). This relationship shows that as an individual’s level of agreement with the above statement increases by 1 Likert scale unit, they will increase their commitment to engage in ecological food consumption behavior by .533 units holding ideology, revised-NEP, gender, age, and kids constant.

The only additional factor that had a relationship with food consumption behavior was the work status portion of the means factor. Within the full model, both dummy variables part-time work and other (i.e. not working outside home) /student/unemployed work status were statistically significant at 5%. Therefore, holding ideology, revised-NEP, gender, age, and kids constant, an individual who works part-time is less likely to engage in ecological food consumption behavior compared to an individual who works full-time. Similarly, compared to full time workers, individuals who work from home, a student, or unemployed are less likely to engage in ecological food consumption behavior.

Concentrating on the control variables and interpreting the full model’s beta coefficients, political ideology demonstrates a robust negative statistical significance ($p < .01$) throughout all regressions. This implies that a more liberal political viewpoint is found to be associated with an increase in partaking in ecological food consumption behavior. The revised-NEP score, which measures a worldview concerning the human-nature relationship, also has a consistent statistically significant impact on food consumption behavior. Although, its impact is weak, individuals with a higher revised-NEP score (aligning with a pro-ecological world-view) also
display higher ecological food index. Lastly, the gender dummy shows a stable significance to at least the 5% level among all the regressions. I found that women were more likely to take up ecological food consumption behaviors than men.

**DISCUSSION AND CONCLUSION:**

Even among individuals who agreed that climate change will cause dramatic changes to the U.S., I found a great deal of diversity among them when it comes to their commitment to engage in ecological food consumption behavior. The key variables this study identified as impacting the attitude-behavior gap are belief in one’s positive impact on the environment, work status, values, and gender.

The first hypothesis was affirmed by the study’s results, where the notion that if an individual believes that their behavior will bring about a positive environmental change, they will be more likely to undertake that behavior. This finding is expected based on other relevant studies, (see Mainieri, Barnett, Valdero, Unipan, & Oskamp, 1997; Lavelle, Rau, & Fahy, 2015) and the behavioral belief concept within the reasoned action approach (Fishbein & Ajzen, 2010).

Income status did not impact food consumption behavior even though food is the second largest household expense next to housing for both rural and urban Oregonians (EPI, 2015). However, work status did impact food behavior although not in the study’s hypothesized relationship direction. Consequently, this hypothesis was not able to be affirmed.

The work status results indicate that working less does not necessarily imply that there is an automatic behavioral time trade between working and engaging in ecological food behaviors. Furthermore, work status and household income have a complex relationship. For example, someone who works part-time may not need to work full-time because their annual household income is high enough not to warrant full-time work. On the other hand, a part-time worker may
have a low annual household income but cannot work full-time nor do they have the means (financial or time) to engage in ecological food consumption behavior.

Similar to the means hypothesis, information (education-based) hypothesis and access (rural/urban divide) hypothesis do not hold true due to statistically insignificant findings. This is not surprising since previous literature showed mixed results.

What accounts for these outcomes? While previous studies have found a link between education and higher rates of ecological behavior (Gossard & York, 2003), this link can vary depending on how information is received (TV or Newspaper) (Jerit, Barabas, & Bolsen, 2006). With regard to rural and urban differences in access to food variety, while research has demonstrated that rural residents have less of a selection in food establishments in which to purchase ecological products, this may be offset by rural residents having better access to harvest their own food in a potential ecological manner (Morton et al., 2008). If this is the case, then access would not impact food consumption behavior.

Several control variables were found to have a statistically significant relationship with food consumption behavior. In line with much of the relevant literature (see Steel, 1996; Dunlap, Xiao, & McCright, 2001), this study also found that more liberal political viewpoints were associated with an increase in ecological behavior. Worldview values also had an impact on food consumption behavior; however, unlike previous studies, my study does not support the conclusion that the revised-NEP is a strong predictor of ecological behavior (Dunlap et al., 2000; Teisl et al., 2010). Lastly, my findings parallel the conclusion of previous studies, which show that females are more likely to engage in pro-ecological behavior (see Xiao & McCright, 2012; Raudsepp, 2001; Stern & Dietz, 1994).
My analysis was limited in several respects. The results are correlational in nature and should not be interpreted as causal evidence. The survey also suffered from response skewness where the average age was 63 years of age. In addition, this study’s sample was concentrated in Oregon; therefore, results may only be generalized to situations within that state. Study results are also limited to ecological food consumption behaviors.

It is not entirely clear if people understand the role that food consumption plays with regard to the production of GHG emissions and climate change impacts. However, with food consumption being one of the top individual actions that Oregonians can take to reduce their GHG emissions, increasing knowledge of the food consumption lifecycle (farm to fork) is paramount. This research has demonstrated that there is a strong relationship between self-efficacy and ecological behavior among Oregonians. Oregonians don’t need to be convinced that they can help reduce GHG emissions but they can use help in translating their beliefs into effective activities that will make a difference. Therefore, a public policy implementation which connects the individual to a behavioral belief-action-outcome may help guide people’s food decisions towards reducing climate change impacts.

Recommendations for future research could focus on critical case studies. For instance, research aimed at understanding what factors are involved in eliciting one to believe that their own behavior can bring about a positive environmental change may help researchers understand how this belief is formed. Furthermore, since the consumption of food is linked not only to ecological factors but also to other values, such as religious, cultural, taste, and nutrition, (Tobler, Visschers, & Siegrist, 2011) future research would benefit from unpacking how these other values interact with an individual’s readiness to take up ecological food consumption behaviors. Lastly, because this study was limited to cross-sectional data, longitudinal research
analyzing how certain factors impact the engagement of ecological food consumption behavior would be beneficial in providing a greater insight into the causal ordering of these factors and how potential changes in these factors can impact an individual throughout their life course.

REFERENCES:


APPENDICES:

Appendix A: 2013 rural-urban continuum codes

<table>
<thead>
<tr>
<th>Metropolitan Counties Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Nonmetropolitan Counties Codes</th>
</tr>
</thead>
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<tr>
<td>3</td>
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<td>11</td>
</tr>
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Appendix B: Construct of the Abbreviated 6-Question New Ecological Paradigm Index Scale

Within the survey, respondents were asked to indicate their level of agreement with each of the below six questions. Responses ranged from 1 = Strongly Disagree to 5 = Strongly Agree.

1. The balance of nature is very delicate and easily upset by human activities.
2. Humans have the right to modify the natural environment to suit their needs.
3. We are approaching the limit of people the earth can support.
4. The so-called "ecological crisis" facing humankind has been greatly exaggerated.
5. Plants and animals have as much right as humans to exist.
6. Humans were meant to rule over the rest of nature.

In order to develop the scale, question 2, 4, and 6, which are negatively worded, were reverse coded so that high values indicated the same response meaning on every question. I then added the responses to each of questions to create a cumulative index. Scores within this index range from a high of 30, indicating a respondent views the world with a pro-ecological stance, to a low of 6, indicating viewing the world with weak ecological concern.
## Appendix C: Summary Statistics for Subsample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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</table>
Appendix D: Oregon Lifestyle Survey (C)

Lifestyle Survey

Please return surveys to:

Lifestyle Survey
School of Public Policy
307 Gilkey Hall
Oregon State University
Corvallis, OR 97331-6206
541-737-2811

ID # ________________________________
[for mailing purposes only]
**Lifestyle Survey 1:**

**Part A: General Attitudes Questions:**

**Q1.** In general, how concerned are you about your individual impact on resource use?

1. Very concerned
2. Somewhat concerned
3. Not concerned
4. No opinion/Don’t know

**Q2.** Would you be willing to do any of the following to reduce your household’s energy use? (Please circle all that apply)

1. Buy products with less packaging
2. Buy more energy-efficient appliances
3. Reduce your car use
4. Share your appliances with neighbors (e.g. washing machine, power tools, etc.)
5. Reduce use of home heating (e.g. turn down thermostat)
6. Reduce use of home air conditioner (e.g. use only on days above a certain temperature)

**Q3.** To what extent do you agree with the following statements? Please circle one.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I feel that my own personal behavior can bring about positive environmental change.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. I would be willing to accept cuts in my standard of living, if it helped to protect the environment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. I would be willing to pay higher prices for goods and services, if it helped protect the environment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. I would be willing to support higher taxes, if it helped to protect the environment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. I would be willing to sacrifice some personal comforts in order to save energy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Q4.** I believe climate change...

1. Will cause dramatic and long-term changes to the United States.
2. Will cause changes but these will be small and easily dealt with.
3. Will make little difference to the United States.
4. Is exaggerated.
5. Is not real.
Part B: Transportation Questions:

Q5. Which method of transport do you most frequently use to travel to work or school? (Please circle one option)

1. Walk
2. Cycle
3. Bus/train
4. Car - gasoline (driver)
5. Car – hybrid or electric
6. Car (carpool or vanpool)
7. Car share (Uber, Zipcar, etc.)
8. Motorcycle
9. Light Rail
10. N/A

Q6. If you do not use public transportation, what is the primary reason for not using public transportation? (Please circle one option)

1. It’s too expensive
2. It’s unreliable
3. It’s very restrictive (can’t go when and where I want)
4. It’s unsafe
5. It’s unhygienic
6. I need to carry heavy/bulky things
7. I need to give rides to others
8. I need the car for work
9. Don’t know
10. Other (please specify)________________________________________________________

Q7. In your opinion, what is the biggest benefit of driving a car?

1. It’s very flexible (freedom to travel)
2. I can carry heavy/bulky things
3. I can give rides to others
4. I’m protected from bad weather
5. It’s safer (less risk of an accident)
6. Don’t know
7. Other (please specify)________________________________________________________
8. There are no benefits to driving a car
Q8. In your opinion, which one of the following would encourage people most to reduce their journeys by car? (Please circle one option)

1. An increase in the cost of fuel/parking/toll charges
2. Improved/more affordable public transportation
3. Improved bike lanes, footpaths and pedestrian crossings
4. More financial incentives to encourage people to walk/cycle
5. Easier online transactions such as banking, shopping, e-government
6. I don’t believe there is any encouragement that would make people leave their car at home
7. Don’t know
8. Other (please specify) __________________________________________

Part C: Food Section:

Q9. What is the most important issue for you when you buy food? (Please choose top three)

1. Price
2. Healthy benefits/Nutritional content
3. Where/how food is produced (i.e. fair-trade, organic)
4. Taste/Flavor
5. Brand
6. It’s easy to cook (i.e. convenience food/frozen meals)
7. Other (please specify) __________________________________________

Q10. If you buy fresh produce, where do you buy it? (Please choose top three)

1. Farmers market
2. Community Supported Agriculture (CSA)
3. Supermarket
4. Food Co-op
5. On-line
6. Other (please specify) __________________________________________
7. Don’t know

Q11. Do you cultivate a garden or grow your own food?

1. Every year
2. Most years
3. Some years
4. Occasionally
5. I don’t cultivate a food garden
Q12. To what extent do you agree with the following statements? Please circle one.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I pay attention to where and how the food I buy is produced.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I try to avoid eating meat as much as possible.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I trust eco-labels.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I try to reduce the amount of food waste that my household produces.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Food that is local, organic or fair-trade is too expensive to buy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Q13. Does your household compost? (please choose one option)

1. Yes (Go to Q15)
2. No (if no, please continue to Q14a)
3. Don’t know (Go to Q15)

Q14a. If no, what would encourage your household to start composting? (Please choose one option)

1. Better facilities
2. More space
3. Financial incentives (to reduce waste/start composting)
4. If friends and family were also composting
5. More information
6. None of the above would encourage me to start composting
7. Don’t know
8. Other (please specify)__________________________________________________________
### Part D: Water:

**Q15.** To what extent do you agree with the following statements? Please circle one.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I pay attention to the amount of water I use.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. I have the right to use as much water as I want.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. I don’t need to save water – there is plenty of it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. Using less water would be unhygienic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Q16.** Has your household cut down on water use over the last year for environmental reasons?

1. Yes
2. No
3. Don’t know
4. No, but I intend to in the future

### Part E: Attitudes Toward the Environment

**Q17.** Listed below are statements about the relationship between humans and the environment. For each, please indicate your level of agreement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The balance of nature is very delicate and easily upset by human activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Humans have the right to modify the natural environment to suit their needs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. We are approaching the limit of people the earth can support.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. The so-called &quot;ecological crisis&quot; facing humankind has been greatly exaggerated.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. Plants and animals have as much right as humans to exist.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f. Humans were meant to rule over the rest of nature.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Part F: Conclusion

We now have a few concluding questions to check to see if our survey is representative of all types of people. We also have included a couple of questions concerning politics. Please remember that all answers are completely confidential.

Q18. What is your current age in years?__________________________

Q19. Please indicate your gender.  1. Female 2. Male

Q20. If you have children, how many still live at home?_______

Q21. Do you own or rent your residence?

1. Own  2. Rent

Q22. In which type of residence do you live?

1. Mobile home or trailer  2. One family house – detached
3. A building with apartments  4. A family house attached to one or more houses
5. Other________________________________________________________

Q23. What level of education have you completed?

1. Grade School  2. Middle or junior high school  3. High School  4. Vocational School
5. Some college  6. College graduate  7. Graduate school  8. Other_______

Q24. Which of the following best describes your current work situation?

1. Employed full-time  2. Employed part-time  3. Not employed outside the home
7. Self Employed  8. Other________________________________________________________

Q25. How would you describe your political ideology?


Q26. How would you describe your partisan affiliation?

Q27. Which category best describes your household income (before taxes) in 2014?
1. Less than $10,000  2. $10,000-$14,999
3. $15,000-$24,999  4. $25,000-$34,999
5. $35,000-$49,999  6. $50,000-$64,999
7. $75,000-$99,999  8. $100,000-$149,999
9. $150,000-$199,999 10. $200,000 or more

Q28. What is your zip code? __________________________

Those are all the questions we have. If you have any additional comments, please include those on a separate piece of paper. Thank you for your time.