

Meat Consumption, Moral Foundations and
Ecological Behaviors Among College Students

by

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ABSTRACT

In recent years, overall consumption of meat products has been decreasing, and at the same time vegetarianism is on the rise. A variety of factors are likely driving changes in consumers' attitudes towards, and consumption of, meat products. Although concern regarding animal welfare may contribute to these trends, growing consumer interest in the roles that production and processing of meat play in terms of environmental degradation could also impact individuals' decisions about the inclusion of meat in their diets. Because these factors could be related to moral attitudes as well, the purpose of this study was to explore the relations among meat consumption, general environmental attitudes, and moral 'foundations' of decision-making, including concern about minimizing 'harm' and maximizing 'care,' as well as issues of 'purity' and 'sanctity.'

A survey was conducted among current college students using the New Ecological Paradigm scale and the Moral Foundations Questionnaire to assess environmental and moral attitudes. A food frequency questionnaire was used to assess meat consumption. Multiple linear regression analyses explored the relations of environmental and moral attitudes with meat consumption, controlling for potential confounding variables. The results showed no significant correlations among meat consumption, environmental attitudes or moral foundations of harm/care and purity/sanctity.

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DEFINITIONS

College Student: A young adult currently enrolled part or full time in college-level courses.

Community-Supported Agriculture (CSA): A program in which individuals in a community pledge to support local farmers through monetary contributions. CSA members share in the risks inherent in farming, but also enjoy the benefits of that farm's production over time.

Farmers' Market: A market where farmers are able to sell directly to the consumer. Individual vendors set up their stands outdoors. There are designated days the farmers' market comes to a certain location, often weekly.

Local Foods: Foods that do not travel greater than a given number of miles from production to consumption are considered 'local.' Distances vary widely; however, 100-mile radii have commonly been used to quantify "local."

Meat: The term meat will be used to include the flesh of land animals such as beef, pork, chicken, and lamb. It will not include fish or other seafood.

Sustainable Agriculture: Methods of agriculture using an ecological approach of integrating plant and animal production that best preserves the integrity of the environment as well as the food system.

Young Adult: Persons ages 18-29 years.

Chapter 1

INTRODUCTION

In 2009, nearly 10 billion animals were slaughtered for food in the United States (USDA Agricultural Statistics, 2010). The total is not only staggering, but it also is suggestive of a less healthy dietary pattern that includes excessive intake of animal-based foods (Block, 2004). The US Department of Agriculture (USDA) Dietary Guidelines recommend 3–6 oz of lean meats, poultry, or fish per day depending upon an individual's caloric needs (USDA Dietary Guidelines, 2010); however, American adults, on average, consume 8 oz per day, almost twice the daily recommended amount (US Census Bureau, 2012). Increased wealth appears to be an important driver of this trend (Speedy, 2003; Walker Rhubart-Berg, McKenzie, Kelling, & Lawrence, 2005). As income rises and middle classes grow, particularly in developing countries, demand for meat and animal-based foods increases (Daniel, Cross, Koebnick, & Sinha, 2011).

There is growing concern over animal welfare in this system as well as the impact of industrialized meat production on the environment. These concerns include greenhouse gas production as well as land and water pollution through the use of fertilizers, pesticides, antibiotics, and large amounts of animal wastes (Joyce, Dixon, Comfort, & Hallett, 2008; Roy et al., 2012). Recent research has also highlighted significant ethical and environmental concerns that arise from the industrialized animal food production system required to support high intakes of meat (Pimentel & Pimentel, 2003; Walker et al., 2005).

Increasing awareness about environmental and other impacts of meat consumption could influence the public to lower overall meat intake, a potentially useful

public health outcome given the contributions of problematic nutrients that meat and other animal food products make the average American diet (USDA Dietary Guidelines, 2010). There is concern, however, that education alone is not sufficient to create behavior change. Researchers focusing on health behavior change interventions have repeatedly tried to develop nutrition education programs to illicit behavior change in food choice with limited success (Guenther, Dodd, Reedy, & Krebs-Smith, 2006; Stables et al., 2002; Franko, 2008; Knight, Dornan, & Bundy, 2006; Noar, Benac, & Harris, 2007; Stadler, Oettingen, & Gollwitzer, 2010; Brug, 2008). Generally, a variety of barriers preventing behavior change in dietary patterns have been identified, including socio-economic status; age; education; access to healthful foods; and factors such as restrained eating, attitudes about food choice, or beliefs towards foods (Drewnowski & Hann, 1999; Betts, Amos, Keim, Peters, & Stewart, 1997; Tepper, Choi, & Nayga, 1997; Amel et al., 2009; Saher, Lindeman, & Hursti, 2006).

However, other trends in food purchasing behaviors suggest that values aside from flavor and cost are driving food choices. For example, community supported agriculture (CSA) programs, farmers' markets, and community gardens are increasing in number (Brehm & Eisenhauer, 2008). These trends are rising in part as an alternative approach to the perceived environmental and other negative impacts of the global food system, with a general focus on fresh fruits and vegetables (Schnell, 2007; Brehm & Eisenhauer, 2008; Conner, Colasanti, Ross, & Smalley, 2010). Farmers' markets and community gardens are showing promise for providing fresh, healthy foods to food deserts within poor urban communities as well (Larson & Gilliland 2009; McCormack, Laska, Larson, & Story, 2010).

Concomitantly, studies describing characteristics of those who purchase local foods or participate in local food programs, as well as their motivations for doing so, have been conducted in recent years (Bamberg, 2003; Zepeda & Lee, 2007; Schnell, 2007). The studies show that the majority of participants are white, affluent women and have higher levels of education. Reasons for participating in these programs include perceived higher food quality, environmental concern, and supporting local communities and local economy (Gilg, Barr, & Ford 2005; Brehm & Eisenhauer, 2008).

Understanding young adults' interest in 'sustainable' and local food production might prove useful for promoting more healthful food choices. This is important because research has shown that diseases such as type 2 diabetes, obesity, and metabolic syndrome have risen considerably in the young adult population, putting them at higher risk of developing cardiovascular disease and cancer later in life (Biro & Wein, 2010, Deshmukh-Taskar, Nicklas, Yang, & Berenson, 2007). College students also often live in specific housing arrangements and social environments, and as such they present unique constraints as well as opportunities for impacting food choices (Deshmukh-Taskar et al., 2007). The dietary patterns of young adults tend to be low in fruit and vegetable intake and high in sodium and fat (Brown et al., 2011; Anding, 2001; Racette, 2008). Limited time and money are the most common reported barriers to healthier eating habits (Betts et al., 1997). If ethical and environmental influences and motivations of this population are better understood, more effective interventions may be designed that will have a higher impact on eating behaviors (in this case meat consumption).

Because little is known about how moral and environmental attitudes might be related to meat intake in college-going individuals, the aim of this study was to explore

potential relations among meat consumption, environmental awareness, and the moral foundations of harm/care and sanctity/purity in college students. It was hypothesized that increased environmental concern would be inversely correlated with meat consumption among college students, controlling for relevant covariates. It was further hypothesized that meat consumption would be inversely correlated with the moral foundation sanctity/purity, controlling for relevant covariates.

Chapter 2

REVIEW OF LITERATURE

Health Behavior Issues

Education is a widely used method of motivating individuals to change eating behaviors in the United States (Knight et al., 2006; Noar et al., 2007; Stadler et al., 2010; Brug, 2008; Tepper et al., 1997; McGinnis & Lee, 1995). However, knowledge-based programs have been unsuccessful in changing many eating behaviors in college-aged individuals, like increasing fruit and vegetable intake, reducing the percent of saturated fat intake, and decreasing sodium intake (Guenther et al., 2006; Stables et al., 2002; Franko, 2008). Franko et al., (2008) evaluated the effectiveness of an Internet-based educational program on healthy behaviors in college students. College students from six different universities were enrolled in either one of two experimental educational programs or a control group. The educational program consisted of two online educational sessions occurring at separate times. All three groups then participated in online post-tests and follow-up assessments at three and six months after the sessions. The results of the study showed no difference in fruit and vegetable consumption or physical activity at three and six months (Franko et al., 2008). Another study used a five-week computer-based program to increase dairy consumption among 294 college students. Half of the participants did the five-week program and the other half were a control. Results did not show a significant difference in dairy consumption between groups after completion of the program (Poddar et al., 2010).

Educational campaigns focused on improving dietary behaviors—like Healthy People 2000 and 2010—also have failed to produce meaningful improvements in the

eating patterns of Americans in general. The Dietary Guidelines for Americans recommend at least five servings of fruits and vegetables daily, the guidelines for saturated fat intake are less than 10 percent of total calories, and sodium intake is recommended to be less than 2,400 mg per day (USDA Dietary Guidelines, 2010). Briefel and Johnson (2004) reviewed dietary intakes and trends from the National Health and Nutrition Examination Survey (NHANES), the Nationwide Food Consumption Survey (NFCs), and the Continuing Survey of Food Intakes by individuals (CSFII). The data from these surveys report 24-hour dietary recalls from Americans of all ages from the years 1989 to 2000. Based on their review, although total fat consumption has decreased, it remains higher than the recommendations. Americans consumed an average of 11 percent of fat calories in the form of saturated fats (Briefel & Johnson, 2004). Americans also consume an average of 3,400 mg sodium per day, and only 17 percent and 28 percent of individuals 2 years and older ate the recommended servings of fruits and vegetables per day, respectively (Henney, Taylor, & Boon, 2010; Wright, Wang, Kennedy-Stephenson, & Ervin, 2003).

Health Behavior Trends

Meat Consumption. The USDA Dietary Guidelines recommend 3–6 oz of lean meats, poultry, or fish per day depending upon an individual's caloric needs (USDA Dietary Guidelines, 2010); however, American adults, on average, consume 8 oz per day, almost twice the daily recommended amount (US Census Bureau, 2012). Excessive intakes of meat are associated with a higher risk of heart disease, which is the number-one cause of death in the United States (Murphy, Xu, & Kochanek, 2012). Kesse-Guyot et al. (2010) evaluated the association between dietary factors and arterial plaques, using

data from the SU.VI.MAX vascular substudy. The SU.VI.MAX study was a randomized control trial for cardiovascular and cancer prevention testing the effect of antioxidant supplementation on arterial wall thickness. The sample population comprised 1162 individuals greater than 50 years old living in or around Paris, France. Kesse-Guyot et al. (2010) found that poor diet, including high meat consumption, was associated with increased hardening of large arteries (Zuriek et al., 2004; Kesse-Guyot et al., 2010). Another study—this one of an Iranian population—revealed that higher meat intake was associated with a greater risk of gastric cancer (Pourfarzi, Whelan, Kaldor, & Malekzadeh, 2009). Despite these health risks, meat consumption remains high in the US and continues to increase globally (Wang et al., 2010; Zhai et al., 2005; Speedy, 2003).

Meat production has tripled since 1960 and the majority of production is taking place in a small number of countries. Speedy (2003) analyzed meat production and consumption data from the United Nations Food and Agriculture Organization (FAO) database (Speedy, 2003). The statistics revealed that the countries producing meat export the majority of that meat to other countries for consumption. The five largest meat-consuming countries are the United States, France, Brazil, Saudi Arabia, and Mainland China (Speedy, 2003). Speedy (2003) concluded that as countries develop and accrue wealth, meat consumption increases. The distribution of meat consumption is, however, uneven globally. Poorer regions such as Africa do not exhibit the same increases in meat consumption, which spotlights wealth as a significant factor in the increase of meat consumption on a global level (Speedy, 2003; Walker et al., 2005). In spite of these growing trends in meat consumption and production, meat-free diet alternatives have taken root.

Meat Alternative Diets. The concept of vegetarian diets is not new. In the United Kingdom several centuries of vegetarian trends culminated in the eventual organization of the Vegetarian Society (Beardsworth & Bryman, 1999). Since then, plant-based diet trends have only increased (Richardson, Shepherd, & Elliman, 1993). Along with vegetarianism, there is also a trend for meat-avoidance. Some businesses and organizations are establishing “Meatless Mondays” as a way to decrease meat consumption without going vegetarian. Meat avoidance diets target consumption of red meat or beef while chicken, lamb, and fish are gaining in popularity (Richardson et al., 1993). However, when Richardson et al., (1993) surveyed 1018 residents in the United Kingdom, they found that based on past and present food records, only one-fourth of those claiming to have reduced meat consumption displayed decreases in actual meat intake (Richardson et al., 1993). Additional research has explored different factors that lead individuals to follow these alternative diets.

Factors Influencing Dietary Trends

Attitudes and Beliefs Surrounding Meat Consumption and Vegetarianism. People turn to vegetarian diets for a variety of reasons. Richardson et al. (1993) found that within a sample of vegetarians in the United States, 65 percent stated that they adhered to a vegetarian diet for health reasons, 50 percent because of animal cruelty, 40 percent in response to world food shortages, and 15 percent for taste reasons (as cited in Cooper et al., 1985). Additional studies conducted in the United Kingdom indicated that while health, taste/texture, ecological factors and the influence of friends were all reasons reported for following a vegetarian diet, ethical and moral reasoning were the most

common influencers of meat-free diets (Beardsworth & Bryman, 1999; Povey, Wellens, & Conner, 2001; Richardson et al., 1993; Beardsworth & Keil, 1991).

Research comparing meat and vegetarian diets indicates that vegetarian diets are generally healthier and that chronic diseases occur less frequently among vegetarian populations. Appleby, Davey, and Key (2002) compared blood pressure between meat eaters, fish eaters, vegetarians, and vegans using data from the EPIC-Oxford Cohort. Their results showed significantly lower systolic and diastolic blood pressure among the non-meat-eating groups (Appleby et al., 2002). Key et al. (1999) used data from the Adventist Mortality Study, the Health Food Shoppers Study, the National Health Service Central Register, the Heidelberg Study cohort, and the Oxford Vegetarian Study cohort to compare mortality rates between vegetarians and non-vegetarians. After adjusting for age, gender, and smoking status, their results showed a significantly lower mortality rate due to ischemic heart disease in vegetarians (Key et al., 1999). The Oxford Vegetarian Study surveyed 11,140 people residing in the United Kingdom with questions regarding dietary and other lifestyle behaviors. Results from the study revealed that vegetarians had significantly better lipid profiles and lower mortality from ischemic heart disease than meat eaters (Appleby, Thorogood, Mann, & Key, 1999).

Researchers have taken interest in the role of ambivalence and attitudes on behaviors in relation to vegetarian and meat eating diets. Research has shown that, in general, increased ambivalence toward meat consumption relates to a decrease in the strength of attitude toward a meat-eating diet (Povey et al., 2001; Fessler & Navarrete, 2003). Povey et al., (2001) had participants complete a questionnaire with questions regarding diet proscription, food attitudes, and eating behaviors comparing meat eaters,

vegetarians, and vegans. Vegetarians held more positive attitudes towards their diet. These positive attitudes were attributed to knowledge and awareness of their diet's health benefits (Povey et al., 2001). Greater ambivalence toward meat eating and weaker attitudes towards diet was noted among meat eaters (Povey et al., 2001; Richardson et al., 1993).

Fessler and Navarrete (2003) used the ambivalence toward meat to explain the disproportionate rate of disgust toward meat over other foods. They proposed that the conflicting attitudes surrounding meat stem from meat being both beneficial and potentially harmful. Meat is nutrient dense with vitamins and minerals important for growth and development. At the same time, meat is associated with health risks including chronic diseases and food-borne illness. This ambivalence contributes to feelings of disgust associated with meat (Fessler & Navarrete, 2003). Comparing food taboos among countries, Fessler and Navarrete (2003) discovered meat to be the main subject of food proscriptions. They collected their data about proscriptions or taboos from ethnographies and collected additional data from experts in their respective fields. Their results showed that some cultures viewed animals as sacred or profane, while others viewed animals as holding cultural or historical significance.

There is debate over the relationship of disgust, meat avoidance, and moral views of meat. Fessler et al., (2003) reported that the disgust felt towards meat was caused by one's moral views, while Rozin, Markwith, and Stoewss (1997) argued that disgust was more the cause of the meat avoidance and that it could develop, then, into an issue of morality (Fessler, Arguello, Mekdara, & Macias, 2003; Rozin et al., 1997). Rozin et al. (1997) stated that moral and health vegetarians like meat to the same degree. However,

moral vegetarians found meat more disgusting. Moral vegetarians tended to have more reasons for avoiding meat and tended to avoid more types of animal foods than health vegetarians (Rozin et al., 1997; Mooney & Walbourn, 2001).

Rozin et al. (1997) explained that when people hold such a moral stance on an issue, they will more often process information in a way that agrees with their point of view. Experiences can influence and promote this idea of ‘moralization’ of preferences. An example given was affective experiences, such as seeing animals slaughtered leading one to vegetarianism. This effect could happen in the other direction as well, referred to as ‘amoralization.’ Such is the trend seen in how society’s views have changed in relation to divorce which is now more socially acceptable than it has been in the past (Rozin et al., 1997). These and perhaps other reasons play a part in influencing the growing trend of vegetarianism seen in the US and other countries.

Environmental Concern

Research on Environmental Awareness. Concern about man’s impact on the environment has been an issue of concern for decades. Early research on environmental issues focused on the public concern about the environment and the surrounding environmental quality (Van Liere and Dunlap, 1980; Dunlap, 1975; Buttel & Flinn, 1976; Slovic and Weber, 1987; Stern, Kalof, Dietz, and Guagnano, 1995). Van Liere and Dunlap (1980) reviewed the research and compiled the existing knowledge regarding public concern over environmental quality. They identified five recurring hypotheses based on demographics and then evaluated how strongly the research supported them. The five categories with developed hypotheses were age, social class, residence, political view, and gender (Van Liere & Dunlap, 1980).

The first hypothesis (the age hypothesis) stated that age and environmental concern were inversely correlated. Since younger individuals are being exposed to more environmental issues via the media, environmental concern is more internalized into their ideology. Older individuals are less likely to advocate issues that require greater change to values, institutions, and behaviors. According to the results of this study, the age hypothesis held true. The overall data showed a moderately strong, negative relationship between age and environmental concern with coefficients ranging from -0.2 to -0.4 (Van Liere & Dunlap, 1980).

Research also hypothesized that social class, including education, income, and occupational prestige would predict overall concern for the environment. This hypothesis argued that higher levels of social class indicate greater environmental concern. Dunlap et al. (1975) tied this theory in with Maslow's hierarchy of needs, suggesting that those of greater affluence have more time and means with which to dedicate to environmental issues (Dunlap et al., 1975). The results showed, however, that the data were less than conclusive in supporting this hypothesis. Social class was not a good indicator, but the results did show a possible relationship with level of education (Van Liere & Dunlap, 1980).

Location was also evaluated as a possible explanation. The residence hypothesis compared urban to rural residents. Urban residents were argued to be more aware of environmental concerns due to the fact that they are more exposed to pollution and poorer environmental conditions. Also, rural residents tend to be more involved in occupations that involve manipulating the environment such as farming, and so environmental concern may be viewed as counterproductive. The results were not clear on the residence

hypothesis, but suggested it may be dependent on specific environmental issues. Local issues were shown to be of greater concern (Van Liere & Dunlap, 1980).

The fourth hypothesis argued that liberals were more environmentally concerned than conservatives. Dunlap (1975) stated that differences in environmental concern would exist because environmental reform would conflict with Republicans' pro-business, anti-government views (Dunlap, 1975). Buttel and Flinn (1976) agreed that differences did exist based on political ideology but argued that while liberals were more supportive of environmental protection, they did not have greater environmental concern than their counterparts (Buttel & Flinn, 1976).

Finally, researchers hypothesized that gender might be predictive of environmental concern. The gender hypothesis, however, was the least conclusive of the five. Little research has been done looking specifically at this demographic. The original assumption was that men would have greater environmental concern as they tend to have higher education, be more politically active, and be involved in the community. The results, however, did not suggest that women may actually have greater environmental concern than men. This stands to reason with current studies looking at the demographics of those who participate in more in sustainable behaviors. Studies have shown that those who shop at farmers' markets, participate in CSA's, and engage more in environmental behaviors tend to be white, affluent women (Gilg et al., 2005). This may be due, in part, to the supposed gender role that the women are the purchasers of food for the household and does not provide insight as to whether men in the household hold the same attitudes (Van Liere & Dunlap, 1980). Based on findings of this early study on environmental concern, it is possible that environmental attitudes might vary depending on the issue

being considered, for example population control, pollution, or wildlife protection (Van Liere & Dunlap, 1980).

More recent research has offered a deeper look at the disparity existing between environmental attitudes and behaviors (Bamberg, 2003). For years, studies focused on the assumption that environmental attitudes were a direct predictor of environmental behaviors (Maloney & Ward 1973; Van Liere & Dunlap, 1980). However, direct correlations between attitudes and behaviors were difficult to establish (Ajzen & Fishbein, 1980; Bamberg, 2003). This approach was re-evaluated and it was determined that while attitude was not a direct predictor of environmental behaviors, it did serve as an important indirect predictor. Ajzen and Fishbein's (1980) theory of planned behavior established a new connection between attitudes and behaviors. The theory of planned behavior uses situation-specific beliefs that involve perceived consequences, expectations of others, and other perceived influences that may help or hinder the specific behavior. These are referred to as behavioral, normative, and control beliefs, respectively. These beliefs and attitudes, together, create a construct that influences behaviors on a situation specific basis (Ajzen & Fishbein 1980; Bamberg, 2003).

To test this theory, Bamberg and colleagues developed an eight-item questionnaire to assess college students' attitudes, intentions, and perceived behavioral control towards engaging in 'green' behaviors (Bamberg, 2003). A post-ready card was included at the back of the questionnaire offering a brochure containing information about green products. If returned, the participants would receive the brochure. The brochure was used to measure participants' actual behaviors, which they could then compare with the reported attitudes and beliefs. The researchers found that out of the 380

participants, only 41 returned the post cards. Those who reported higher environmental concern returned significantly more post cards than those who reported less environmental concern ($p < 0.05$). The results of the study confirmed that attitudes did not directly relate to behavior, however, they did serve an important role in the development and interpretation of the situation-specific problem. The study was limited in its inability to show a causal relationship as the data were only correlational. Experimental studies would be needed to further develop and test this theory (Bamberg, 2003).

Measures to Assess Environmental Concern. Traditional values and beliefs inherent in western society have been suggested to contribute to the environmental issues with which we contend today, which include the beliefs in abundance, progress, growth, prosperity, private property rights, and limited government planning (Disch, 1970; Caldwell, 1970; Campbell & Wade, 1972; Whisenhunt, 1974; Dunlap & Van Liere, 1978). Pirages and Ehrlich (1974: 43-44) labeled these traditional beliefs the “Dominant Social Paradigm.” As interest for the environment has grown, research has tried to accurately assess those interests and attitudes surrounding environmental concern. In response, Dunlap and Van Liere (1978) took this shift toward environmentalism and labeled it the “New Environmental Paradigm.” The New Environmental Paradigm focuses on broad issues of environmental concern such as limits of growth and anti-anthropocentrism. With the development of the New Environmental Paradigm, Dunlap and Van Liere (1978) developed a measure to assess those attitudes among the public. Initial development of the measure used on two samples in the state of Washington. One group was the general public and the other group was chosen from members of an environmental organization as a comparison group in determining the validity of the

measure. A 12-item questionnaire comprised questions concerning environmental issues related to pollution, population, and natural resources using a Likert scale response method. The results showed a significantly stronger environmental response from the environmental organization group compared to the general public ($p < 0.001$).

Twenty years after the initial development of the New Environmental Paradigm, Dunlap, Van Liere, Mertig, and Jones (2000) updated the scale to include newer emerging environmental concerns like global warming and to update terminology more currently in use. Additional items were added and questions were balanced between pro and anti NEP questions. This updated scale was labeled the 'revised New Ecological Paradigm' (revised NEP). The term Ecological was decided to be more reflective of the wide range of issues involving the environment. Researchers have widely used and analyzed the revised NEP scale as an effective measure of environmental/ecological attitudes (Cordano, Welcomer, & Scherer, 2003; Dunlap et al., 2000; Brehm & Eisenhaur, 2008).

Environmental Trends

Sustainability. Sustainable practices are gaining attention among many disciplines. Each discipline has a different definition of sustainability, but general principles behind sustainability include efficient and balanced use of resources, the use of resources and materials in a way that is maintainable through multiple generations, and economies/developments that continue (Ciegis, 2009). The term sustainability has generally included social, environmental, and economic factors as the three main foci (Conner et al., 2010). Gilg et al., (2005) conducted a study to identify environmentally sustainable activities. They determined that such activities included using detergents that

have reduced environmental impact, avoidance of aerosols, using recycled paper products, buying organic produce, buying from local stores, buying locally grown foods, fairly traded goods, goods using less packaging, and using reusable bags at the grocery stores (Gilg et al., 2005).

Researchers have started exploring different aspects of sustainable behaviors. Amel, Manning, and Scott (2009) conducted a study at a Midwestern sustainability expo investigating the connection between mindfulness and sustainable behavior. One hundred participants completed a short survey with questions regarding knowledge, beliefs, behaviors, and other attributes. The researchers argued that habitual activities people engage in daily are not as sustainable as they could be, but by becoming more mindful and aware of routines and activities, individuals would be more likely to change their behaviors. An example provided was drivers of the Toyota Prius. These drivers are constantly receiving feedback on their driving and its impact on gas mileage, thus motivating them to change their behavior more immediately. The results from the survey showed that awareness was significantly correlated with self-reported sustainable behaviors ($p < 0.001$) (Amel et al., 2009).

Sustainable Agriculture. There are a growing number of ways individuals are becoming more involved in the sustainable production and procurement of their food goods. Some of these activities include farmers' markets, community gardens, eating locally, and community supported agriculture (CSA's). Farmers' markets are a growing venue providing benefit to farmers and consumers. As profits from farming and viable farming land decrease, these markets are providing additional market opportunities for farmers and access to healthful, local foods for consumers (Conner et al., 2010). The

purpose of community gardens is for communities to be able to grow and consume fresh fruits and vegetables in a local and accessible setting. Community gardens are designed to be publicly available and cared for. They are typically seen in urban areas often located on vacant lots or other public locations (McCormack et al., 2010).

Agricultural sustainability has gained greater interest recently, but has been a subject of concern across disciplines for a number of decades. CSA's started as far back as 1960 in Japan, migrated through Europe and were introduced in the 1980s in the United States (Schnell, 2007). Individuals started looking for local alternatives over larger agricultural corporations in an ever-growing global economy (Schnell, 2007; Brehm & Eisenhauer, 2008). Schnell (2007) pulled data from the CDC, Environmental Systems Research Institute (ESRI), 1997 agricultural census, demographic data from the 2000 census, Behavior Risk Factor Surveillance System and CSA data from the Robyn Van En Center for CSA Resources to identify what types of individuals or communities participate in CSAs. Populations with higher education were found to have more CSAs. This was attributed to the idea that as individuals become more educated on environmental issues they become more environmentally and agriculturally sensitive or interested. CSAs were less likely to be seen in geographical areas of high poverty and were largely around metropolitan areas. Schnell argued that urban sprawl and increasing land prices are a threat to CSAs and their farmers because the land is often rented and land is being lost to housing, stores, and malls (Schnell, 2007).

As participation in CSAs has increased, researchers have become interested in the reasons that motivate members to participate. Brehm and Eisenhauer (2008) conducted a survey among CSA members in Central Illinois and New Hampshire consisting of

questions regarding motivations for participation. Mean scores were compared among the different motivators ranking highest to lowest. The most common reasons reported for participating in CSAs were for higher food quality, supporting and improving local community and economy, and environmental concern. Brehm found that those who participated in CSAs were more affluent/educated individuals (Brehm & Eisenhauer, 2008). While many of the agricultural practices mentioned above are designed to engage individuals in certain environmentally conserving activities, there are also activities individuals can decrease their participation in which would also improve agricultural practices.

Growing Concern of the Impact of Meat Production on the Environment

The general public is concerned about the environment and health, but there appears to be limited connection with the relationship between diet and environment (Joyce et al., 2008). Joyce et al. (2008) conducted a street survey asking individuals open-ended questions about potential methods of improving the environment. From the 107 respondents who participated in the survey, only 3.2% connected diet with the environment. This disconnection between the impact of diet and environment is of growing interest to researchers, particularly in regards to the impact of meat consumption on the environment (Joyce et al., 2008; Pimentel & Pimentel, 2003; Roy et al., 2012).

Producing meat for consumption is far more costly to the environment than producing plant-based proteins. The amount of land for grazing and grain production as well as the amount of fresh water needed to feed livestock is taking a heavy toll on the environment. Ninety nine percent of food in the US is produced on land and water used for agriculture in the United States accounts for 85% of freshwater use (Pimentel &

Pimentel 2003). Pimentel and Pimentel (2003) predict that as the US population continues to grow, and is projected to grow, the current methods of agriculture and food systems will not be sustainable in terms of land and water resources available with current consumption practices. The amount of grains consumed by livestock in the United States is seven times the amount consumed by Americans. That amount of grain could feed approximately 840 million people on a plant-based diet (Pimentel & Pimentel 2003).

Livestock is a major source of greenhouse gases and is the source of much land and water pollution through the use of pesticides, antibiotics, and from large amounts of animal wastes more concentrated in areas of production (Joyce et al., 2008). Roy et al. (2012) collected data on greenhouse gas emissions generated by meat production from research related to meat production in Japan. From the results it was estimated that about 50% of environmental impact is related to food and agricultural practices (Roy et al., 2012).

Moral Foundations Theory

Haidt and Graham (2007) built on earlier works in the field of moral reasoning and derived five categories used to make moral decisions and labeled them the 'Moral Foundations.' These categories are: harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity. Harm/Care relates to the universal aversion to suffering. The presumed foundation incorporates the idea that it is rarely ever deemed appropriate to harm another person. Even in cases that are sometimes deemed so, such as capital punishment, there is still often disagreement. Similarly, care for others is innate in even the most basic relationships. From Haidt's perspective, this is related to the mother-

child relationship, which then extends to other more general human interactions.

Qualities of caring, in general, are held in higher esteem (Haidt & Graham, 2007).

Fairness/Reciprocity revolves greatly around the idea of fairness. Haidt likens fairness to justice. Fairness is a very universal idea and is easily recognizable by people of all ages. Haidt is careful to note that fairness does not necessarily equate to equality of outcomes. Reciprocity is related to our interactions with each other. As different groups come together to exchange goods or services in any capacity, reciprocity ties in with this sense of give and take. These interactions should happen in a fair and just manner (Haidt & Graham, 2007).

Ingroup/Loyalty describes a sense of belonging and association within a constructed group. Groups may be built around government, religion, social structure, or other organizational entities. Loyalty is considered very important to members of a group. Activities that do not encourage unity or are seen as opposed to the good of a group are not favored. Those with a greater sense of loyalty may respond more positively to ideas such as heroism and patriotism; conversely, diversity may be less valued (Haidt & Graham, 2007).

Authority/Respect is related, to a degree, to ingroup/loyalty. Haidt notes that most humans prefer to work within a hierarchal social structure. Individuals who stand apart from their group with certain prestige or authority may become leaders, who often are looked up to and provide deferential treatment or respect. However, there are at the same time expectations that leaders are to meet or perform for the benefit of the group. Failing those, leaders may lose their status and be considered ineffective or not beneficial to the group (Haidt & Graham, 2007).

Purity/Sanctity correlates somewhat with the notion of disgust. Disgust universally taps into the idea of purity in terms of health and disease transmission. All cultures throughout the world and time have had proscriptions for avoiding disease and many of these are buttressed with feelings of disgust (Fessler & Navarrete, 2003). Haidt explains that in many cultures, these extend beyond health and have developed social contexts based on each culture's set of morals and virtues. For example, some cultures liken the body to a 'temple' that is to be kept clean and pure. Other carnal appetites and pleasures may also have negative associations with the purity of the body, including lust, gluttony, or other hedonistic approaches to the body (Haidt & Graham, 2007).

Haidt clarifies that although these moral foundations are the basis for making decisions, a given moral foundation has the potential of overriding another. For example, fairness and reciprocity may be overruled due to strong feelings of ingroup and loyalty (Haidt & Graham, 2007). Haidt uses conservatives and liberals as examples of how individuals can operate based on the same moral foundations, yet interpret them differently to come to different conclusions, suggesting that much of the misunderstanding between these groups originates from differences in how these moral foundations are developed. Liberals, for example, might rely more heavily on the foundations of harm/care and fairness/reciprocity when making decisions. Conservatives may be more likely to use all five moral foundations relatively equally when making decisions. As an example, a conservative's reasoning for a decision may seemingly oppose justice, but it must in order to appeal to authority/respect or ingroup/loyalty. A liberal would not understand a decision that so wholly opposes justice (Haidt & Graham, 2007).

College Student Adults and Dietary Behaviors

Eating Behaviors. There is growing interest in the eating behaviors and health of young adults and college students. This is in part because research has shown that type 2 diabetes, obesity, and metabolic syndrome have risen considerably in the adolescent and young adult populations putting them at higher risk of developing cardiovascular disease and cancer later in life (Biro & Wein, 2010, Deshmukh-Taskar et al., 2007). General dietary patterns of young adults do not meet the dietary guidelines. Their dietary patterns tend to be low in fruit and vegetable intakes and high in sodium and fat (Brown et al., 2011; Anding, 2001; Racette, 2008). Racette et al. (2005) surveyed 764 freshmen and sophomore students about dietary and exercise patterns and 70% of the students did not eat the recommended five servings of fruits and vegetables daily (Racette et al., 2005). One survey including a dietary recall conducted among college women found that the reported diets exceeded the dietary guidelines for sodium and fat intakes (Andling, 2001).

College students also often live in specific housing arrangements and social environments, and as such they present unique constraints as well as opportunities impacting food choices (Deshmukh-Taskar et al., 2007). Limited time and money are reported barriers to healthier eating habits (Betts et al., 1997; Silliman et al., 2004). Convenience has reported to be an important factor in food choice for both students and nonstudents (Betts et al., 1997).

If the influences and motivations of this population are better understood, more effective interventions may be designed that will have a higher impact on eating behaviors (in this case meat consumption). Silliman et al. (2004) administered a survey to a stratified random sample of 471 college students. The survey included questions about

demographic information, exercise patterns, dietary habits, and perceived barriers to healthy eating. From their results they found that more than half of respondents ate less than one serving of fruits and vegetables per day. Lack of time was listed as the number one barrier to healthier eating with lack of money and taste preferences as the next most influential reasons (Silliman et al., 2004). Brevard and Ricketts (1996) studied differences in eating behaviors among 104 college students based on living arrangements. Students living off-campus showed higher protein intakes and tended toward a higher lipid profile. The researchers suggested that school's food systems are under more pressure to provide low-fat meal plans for students living in the dorms (Brevard & Ricketts, 1996).

There are also many social factors influencing food choices from media, peers, and parents (Mooney & Walbourn, 2001; Georgiou et al., 1997; Lau, Quatrel, & Hartman, 1990). Lau et al., (1990) conducted a survey about dietary and health behaviors to college students and their parents to evaluate the influence of parents and peers on college students' eating behaviors. From their results they reported that parents still hold a significant influence ($p < 0.003$) on the beliefs and behaviors of young adults as well as from peers and other adults (Lau et al., 1990). Garcia, Sykes, and Matthews (2010) conducted a qualitative study among 28 college students in which the students discussed perceived facilitators and barriers to healthy eating in focus groups. The results showed that media played a role as both a facilitator in regards to nutrition knowledge as well as a barrier through negative self-image and misleading labeling (Garcia et al., 2010).

Intervention in the Young Adult Population. Due to the growing interest and concern in health behaviors of college age students and their somewhat unique living

environment, as noted above, this population was determined to be most appropriate to study the relationships between meat consumption, environmental concern, and issues of morality associated with eating behaviors. Because little is known about how moral and environmental attitudes might be related to meat intake in college students, the aim of this study was to explore potential relations among meat consumption, environmental awareness, and the moral foundations of harm/care and sanctity/purity in this population. Results from this study would provide a foundation for further research and intervention studies targeting behavior change using the moral foundations. We hypothesized that increased environmental concern would be inversely correlated with meat consumption among college students, controlling for relevant covariates. We further hypothesized that meat consumption would be inversely correlated with the moral foundation sanctity/purity, controlling for relevant covariates.

Chapter 3

METHODS

Survey Design

This survey-based study was an exploration of the role of morality in food-related behaviors and attitudes. In particular, the present work focused on environmental and moral attitudes in relation to meat consumption among students attending college who were at least 18 years of age.

Prior to development and implementation of the survey, however, qualitative interviews were performed to gain insight regarding the population's potential views on morality, sustainability, and eating behavior influences. Interviewing was conducted on two separate occasions at different campuses of Arizona State University to capture a wider spread of the population. Interviews were conducted in the dining halls of campus housing on both locations. Researchers explained the purpose of the interview, obtained consent, and provided participants a \$5 gift card to Starbucks at the end of the interview for their participation. See Appendix A and B for the consent form and questions asked during this preliminary interviewing. IRB approval was granted with exemption status through the ASU Institutional Review Board (Appendix C).

From the initial qualitative interviewing, a variety of views and attitudes were expressed. Multiple individuals felt that they could not follow a vegetarian diet, but they held those who were able to follow such a diet in higher esteem. Participants provided mixed responses regarding influences of peers. For some, peers were motivating to participate in healthier eating habits and exercise, while others stated their peers and roommates influenced them to choose less healthy food choices. Morality had different

meanings for individuals. Many described morality as a set of beliefs regarding personal values and conduct. Interpretations of morality were varied among participants.

Based on results of the preliminary qualitative data, the research team developed a survey tool incorporating a number of validated measures. The present study included only a subset of all measures included in the survey. Specifically, these measures included a 30-item tool to assess Moral Foundations (Graham, Haidt, & Nosek, 2009; Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2010), a 15-item tool to measure environmental attitudes called the Revised New Ecological Paradigm (NEP) scale (Dunlap et al., 2000; Cordano et al., 2003), and a set of demographic items. Although multiple dietary behaviors were assessed, only meat consumption was pertinent to this study and was estimated using the National Health and Nutrition Examination Survey (NHANES) food frequency questionnaire (Block, 2004).

The Moral Foundations questionnaire is designed from Haidt and Graham's (2007) work, which focuses on five moral foundations (harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity). These questions identify which moral foundations influence an individual's decisions. There are six questions for each foundation and respondents choose from strongly disagree to strongly agree on a six-point Likert scale. Those responses are scored from one to six and then averaged for each foundation (Haidt & Graham, 2007).

The Revised NEP scale is a revised scale from the New Environmental Paradigm scale developed by Dunlap and Van Liere in 1978. There are 15 items in the Revised NEP scale with statements designed to assess environmental attitudes. Respondents use a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. Responses

score from one to five and are totaled to provide a summative score of overall environmental concern. These questions can be categorized into five subscales that focus on specific aspects of environmental concern which are anti-anthropocentrism, nature balance, exemptionalism, ecocrisis, and growth limit (Dunlap et al., 2000; Dunlap & Van Liere, 1978).

Survey Administration

Participation criteria for the study included being at least 18 years of age and being a currently enrolled college student. During the spring of 2012, participants were recruited via email messages advertising the study and providing a link to an online Survey Monkey survey. Email addresses of eligible participants were provided with approval by participating schools' administrations. Participants were prompted to follow the link to complete the survey online. The beginning of the survey included an introduction explaining the nature of the study, expected time to complete the survey, ability to withdraw from the study at any time without penalty, and the chance for a prize by being entered into a raffle upon completion of the survey for \$100 gift card to Amazon.com. By clicking a button to continue to the online survey, participants gave their consent to participate.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 20. Data were checked for normality, and invalid responses and outliers were removed from the data set along with data from those who did not meet the criteria for participating in the study. One Way Analysis of Variance (ANOVA) statistics were performed to examine the differences among demographics across measures of

meat consumption, morality, and environmental attitudes. Finally, multiple linear regression was used to assess the relationship between NEP scores, moral foundations, and meat intake, controlling for relevant demographic covariates.

Sample size and power were determined using the sample calculator GPower version 3.1.4. Multiple linear regression was the statistical test used with a significance level of 0.05, effect size of 0.138 and a power of 0.80. The number of predictors with significant demographics, NEP, and the moral foundations added up to 12. These data were entered and calculated for a minimum sample size of 60.

RESULTS

Demographics

Five hundred and sixty three participants were included in the study. Demographics of the study population are shown in Table 1. A large percentage of participants in the study were ages 18-24 years (77.1%, n=434). Those ages 25-30 years constituted an additional 15.1% (n=85) with only 7.8% (n=44) being older than 30 years of age. The study population was predominantly female (72.7%, n=408). Nearly half of all respondents were Christian, including 25.2% (n=142) identifying as Catholic, Lutheran, Protestant, or non-denominational, and another 17.8% (n=100) identifying as Mormon. Twenty eight percent did not identify any religious affiliation (n=161). Over half (64.5%, n=363) of participants had completed some college but with no degree. Participants with Associates, Bachelors, or Graduate/Professional degrees made up 5% (n=28), 11.7% (n=66), and 4.1% (n=23) of the sample, respectively. Political views were varied: 23.6% (n=133) considered themselves liberal, 10.7% (n=60) identified as moderate, and 23.4% (n=132) noted that they were conservative. Of the rest, 27.6% (n=155) had no response, while 12% (n=70) were not political or did not know. Health-related majors made up 65.6% (n=369) of participants. STEM majors (science, technology, engineering, and math) constituted 19.4% (n=109), art and social sciences accounted for an additional 7.5% (n=42), and “other” majors (sustainability, earth sciences, and non-specified) were grouped together comprising 7.5% (n=42).

Table 1: General Demographics

Demographic	N	%
Age		
18-24	434	77.1
25-30	85	15.1
>30	44	7.8
Gender		
Male	153	27.3
Female	408	72.7
Religion		
Christian ^a	142	25.2
LDS(Mormon)	100	17.8
No particular belief	42	7.5
Multiple selections	43	7.6
Other ^b	75	13.3
No selection made	161	28.6
Education		
High School or GED	77	13.7
Some college	363	64.5
Associates	28	5
Bachelor Degree	66	11.7
Graduate/Professional Degree	23	4.1
No response	6	1.1
Political		
Very liberal	22	3.9
Liberal	74	13.1
Slightly liberal	37	6.6
Moderate	60	10.7
Slightly conservative	49	8.7
Conservative	71	12.6
Very conservative	12	2.1
Libertarian	13	2.3
Not political/don't know	70	12.5
No response	155	27.6
Major		
STEM ^c	109	19.4
Health Related ^d	369	65.6
Art/Social Sciences	42	7.5
Other ^e	42	7.5
Ethnicity		
Non-Hispanic White	382	68
Non-Hispanic Black	18	3.2
Hispanic	89	15.8
Non-Hispanic Asian	52	9.3
Other	21	3.7
Total	563	

a includes Catholic, Lutheran, Protestant, non-denominational Christian

b Agnostic, Atheist, Buddhist, Muslim, Hindu, Humanist, Jehovah's Witness, Orthodox, Russian Orthodox, Unitarian Universalist

c non health related sciences (science, technology, engineering, math)

d nutrition, EXW, exercise physiology, kinesiology, nursing, medical professions, other health sciences

e non-specified, earth sciences, sustainability

Table 2 displays means for both the NEP and the moral foundations subscales of harm/care and purity/sanctity by demographic variables. No significant differences in mean scores for NEP or moral foundations were found among age groups. Mean scores for the NEP were significantly different between genders, however, with women scoring higher (51.49) than men (46.33) ($p < 0.001$). Among religious groups, Mormons scored significantly lower than all other religious categories for NEP (41.91) ($p = 0.001$). Finally, those self-identifying as very liberal to moderate had significantly higher NEP mean scores (56.18-52.76) than those who identified as any type of conservative (45.63-40.75) ($p = 0.002$). No other differences were found among demographic variables for NEP.

While few significant differences were seen between groups for the moral foundation harm/care, a number of differences were found among scores for the moral foundations purity/sanctity. Women scored significantly higher for harm/care (4.79) than men (4.29) ($p < 0.001$). Mormons scored significantly higher (4.73) than all other religious groups for purity/sanctity ($p < 0.001$). Christians scored significantly higher (4.06) for purity/sanctity than those with no particular belief, those who selected multiple religions, and those labeled under “other” ($p < 0.001$). Those who made no religious selection scored significantly higher (3.93) for purity/sanctity than those with no particular belief ($p = 0.004$). STEM majors scored significantly lower (4.42) than health-related majors (4.73) for the moral foundation harm/care as well as significantly lower (3.21 vs 4.05) for purity/sanctity ($p = 0.005$; $p < 0.001$). Those in the “Other” major category also scored significantly lower than health-related majors (3.24) ($p < 0.002$) for purity/sanctity. For the Moral Foundation of purity/sanctity, all liberals had significantly lower mean scores (2.64-3.34) than all conservatives (4.33-4.79) ($p < 0.001$). The mean score of moderates

(3.86) for purity/sanctity was significantly higher from very liberal, liberal, conservative, and very conservative ($p < 0.045$) but not with those identified as slightly liberal/conservative.

Table 2: Significant Demographics

Demographic (N=563)	NEP	MF Harm/Care	MF Purity/Sanctity
	<i>Mean(SD)</i>	<i>Mean(SD)</i>	<i>Mean(SD)</i>
Age			
18-24	49.68(9.78)	4.65(0.73)	3.82(1.16)
25-30	49.9(11.06)	4.64(0.82)	3.88(1.06)
>30	54.02(12.02)	4.79(0.91)	3.59(1.21)
Gender			
Male	46.33(10.05) ^a	4.29(0.93) ^b	3.72(1.21)
Female	51.41(9.98) ^a	4.79(0.64) ^b	3.85(1.12)
Religion			
Christian [†]	51.58(9.11)	4.77(0.76)	4.06(0.84) ^{d,e}
LDS(Mormon)	41.91(8.09) ^c	4.57(0.73)	4.73(0.82) ^{d,e}
No particular belief	54.52(9.52)	4.58(0.69)	3.27(1.12) ^{d,e,f}
Multiple selections	52.41(10.61)	4.65(0.73)	3.01(0.98) ^{d,e,g}
Other ^{††}	54.38(9.52)	4.71(0.76)	2.75(0.95) ^{d,e,h}
No selection made	49.81(9.11)	4.55(0.81)	3.93(1.05) ^{e,f,g,h}
Education			
High School or GED	49.65(9.45)	4.68(0.6)	3.98(1.06)
Some college	49.83(9.97)	4.65(0.77)	3.79(1.18)
Associates	48.87(12.06)	4.73(0.73)	4.22(0.8)
Bachelor Degree	50.02(10.87)	4.55(0.91)	3.69(1.05)
Graduate/Professional Degree	54(10.9)	4.74(0.62)	3.53(1.3)
Major			
STEM ^{†††}	48.44(9.09)	4.42(0.81) ⁱ	3.21(1.25) ^j
Health Related ^{††††}	49.77(10.39)	4.73(0.75) ⁱ	4.05(1.05) ^{j,k}
Art/Social Sciences	51.03(12.74)	4.72(0.71)	3.62(1.17)
Other [‡]	54.96(11.65)	4.51(0.64)	3.24(1.00) ^k
Political			
Very liberal	56.18(8.39) ^l	4.84(0.67)	2.64(1.2) ^{m,n}
Liberal	56.65(8.06) ^l	4.77(0.65)	3.09(1.07) ^{m,n}
Slightly liberal	53.54(8.43) ^l	4.73(0.68)	3.34(0.97) ^m
Moderate	52.76(9.60) ^l	4.78(0.72)	3.86(0.99) ⁿ
Slightly conservative	45.63(9.02) ^l	4.61(0.73)	4.33(0.85) ^m
Conservative	43.84(9.75) ^l	4.65(0.62)	4.68(0.76) ^{m,n}
Very conservative	40.75(11.34) ^l	4.33(1.05)	4.79(1.33) ^{m,n}
Ethnicity			
Non-Hispanic White	49.11(10.49)	4.67(0.75)	3.81(1.17)
Other ^{††}	52.28(9.24)	4.63(0.78)	3.81(1.09)
<p><i>a,b,d,e,f,g,h,i,j,k: all superscripts denote a significant difference between groups (Tukey p<0.05)</i> <i>c: LDS scored significantly lower than all other religions noted, no other significant differences in NEP score by religion</i> <i>l: all liberal groups & moderates had significantly higher NEP scores than all conservative groups</i> <i>m: all liberal groups scored significantly lower than all conservative groups, no significance within liberal or conservative groups</i> <i>n: moderate scored significantly different from very liberal/conservative and liberal/conservative, but not slightly liberal/conservative</i></p>			

[†] Includes Catholic, Lutheran, Protestant, non-denominational Christian

^{††} Agnostic, Atheist, Buddhist, Muslim, Hindu, Humanist, Jehovah's Witness, Orthodox, Russian Orthodox, Unitarian Universalist

^{†††} non health related sciences (science, technology, engineering, math)

^{††††} nutrition, EXW, exercise physiology, kinesiology, nursing, medical professions, other health sciences

[‡] non-specified, earth sciences, sustainability

^{‡‡} Includes non-Hispanic Black, Hispanic, and Non-Hispanic Asian

Table 3 displays means for meat consumption by demographic category. Meat consumption was estimated as total servings per day (serv/d) and ranged from 0-4.43 serv/d (SD=0.73) in this sample. The mean for meat consumption among all participants was 1.18 serv/d. Meat consumption differed significantly between genders, with males consuming more meat (1.38 serv/d) compared to females (1.11 serv/d; $p=0.001$) (see figure 1). The only other significant difference in meat consumption was Non-Hispanic Whites eating significantly less meat than those identified as 'other' ($p<0.036$).

Table 3: Demographics and Meat Consumption

Demographic (N=563)	Total Meat servings/day (excludes seafood)
	<i>Mean(SD)</i>
Age	
18-24	1.18(0.73)
25-30	1.15(0.58)
>30	1.14(0.89)
Gender	
Male	1.38(0.76) ^a
Female	1.11(0.71) ^a
Religion	
Christian [†]	1.29(0.76)
LDS(Mormon)	1.03(0.50)
No particular belief	1.22(1.0)
Multiple selections	1.09(0.70)
Other ^{††}	1.11(0.72)
No selection made	1.39(0.72)
Education	
High School or GED	1.23(0.78)
Some college	1.21(0.72)
Associates	1.12(0.51)
Bachelor Degree	0.90(0.63)
Graduate/Professional Degree	1.08(0.55)
Major	
STEM ^{†††}	1.23(0.73)
Health Related ^{††††}	1.15(0.72)
Art/Social Sciences	1.36(0.68)
Other [‡]	0.91(0.76)
Political	
Very liberal	1.22(0.78)
Liberal	1.17(0.87)
Slightly liberal	1.0(0.56)
Moderate	1.19(0.78)
Slightly conservative	1.2(0.62)
Conservative	1.13(0.59)
Very conservative	1.63(0.88)
Ethnicity	
Non-Hispanic White	1.12(0.71) ^b
Other ^{††}	1.29(0.77) ^b
Average	1.18(0.73)
a,b: all superscripts denote a significant difference between groups (Tukey p<0.05)	

[†] Includes Catholic, Lutheran, Protestant, non-denominational Christian

^{††} Agnostic, Atheist, Buddhist, Muslim, Hindu, Humanist, Jehovah's Witness, Orthodox, Russian Orthodox, Unitarian Universalist

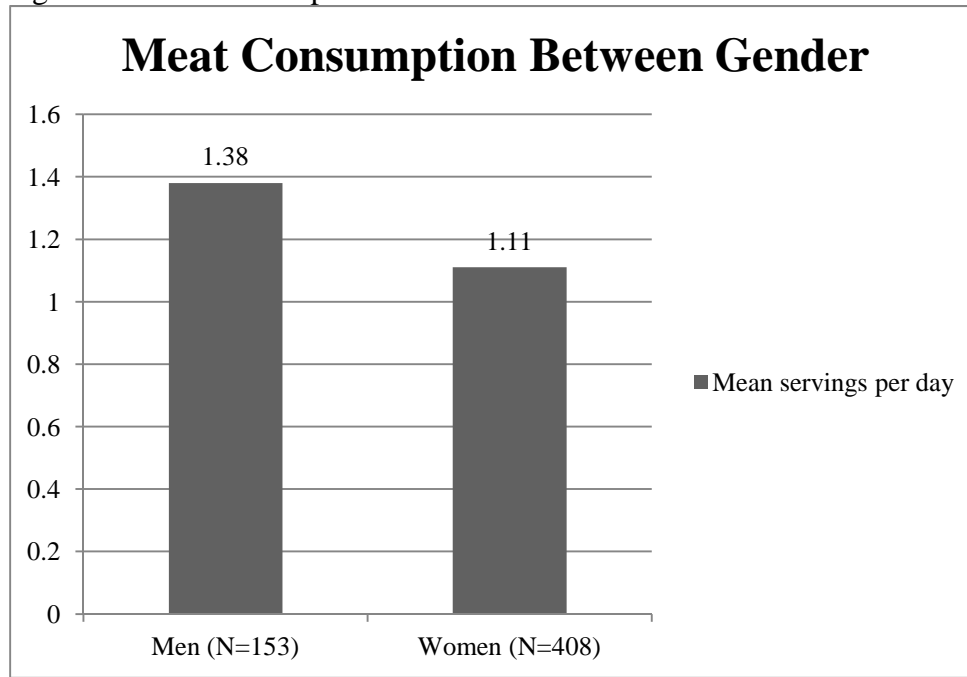
^{†††} non health related sciences (science, technology, engineering, math)

^{††††} nutrition, EXW, exercise physiology, kinesiology, nursing, medical professions, other health sciences

[‡] non-specified, earth sciences, sustainability

^{‡‡} Includes non-Hispanic Black, Hispanic, and Non-Hispanic Asian

Figure 1: Meat Consumption Between Gender



Independent Variables and Pearson Correlation

Pearson correlations were conducted among the dependent and independent variables prior to conducting the regression analyses. Correlations were performed with the NEP scale and each of the Moral Foundations to check for collinearity between the independent variables. Meat consumption was also analyzed with the independent variables. Table 4 shows the correlations are weak among all the variables with the exception of progressivism and the NEP which did show a moderate correlation ($r=0.516$). Partial correlations are included in the linear regression models.

Table 4: NEP, Moral Foundations, Meat Intake and Pearson Correlations

Moral Foundations (N=563)	NEP Pearson correlation (P value)	Meat Intake Pearson correlation (P value)
Harm/Care	0.261 (<0.001)	-0.04 (0.43)
Fairness/Reciprocity	0.285 (<0.001)	-0.05 (0.34)
Ingroup/Loyalty	-0.161 (0.001)	0.06 (0.21)
Authority/Respect	-0.235 (<0.001)	0.10 (0.05)
Purity/Sanctity	-0.318 (<0.001)	0.04 (0.47)
Progressivism	0.516 (<0.001)	-0.11 (0.03)
Meat Intake	-0.02 (0.69)	

Multiple Linear Regression

Multiple linear regression was used to assess the relations among environmental attitudes and moral foundations of harm/care and sanctity/purity, with meat consumption (the dependent variable of interest) after controlling for gender, ethnicity, religion, major, and political view. The model was built by first including significant demographic variables in block 1 to control for these covariates. The NEP scale was placed in block 2, the two moral foundations of interest harm/care and purity/sanctity in block 3, and the remaining moral foundations in block 4. As shown in Table 5, demographics explained 4% of the variance in meat consumption. The NEP explained an additional 0.1% of the variance. The two Moral Foundations of interest (harm/care & purity/sanctity) did not explain any additional variance, but the other four moral foundations fairness/reciprocity, authority/respect, ingroup/loyalty, and progressivism explained an additional 1.6% of the variance in meat consumption. Within the four different blocks of variables included in the regression model, gender and ethnicity showed the only statistically significant influence to the variance in the model (beta -0.16, p=0.01 and beta 0.10, p=0.01

respectively). A second regression model was run changing order of the NEP and Moral Foundation variables switching blocks two and four with similar results (Table 6).

Table 5: Multiple Linear Regression Model 1

Regression Model 1 (N=563)	R²	B	p	Partial Correlation
Block 1	0.040			
Gender		-0.16	0.01*	-0.16
Ethnicity		0.10	0.01*	0.10
Religion		-0.02	0.75	-0.04
Major		-0.04	0.46	-0.07
Political Belief		-0.01	0.99	0.04
Block 2	0.041			
NEP Score		0.06	0.41	-0.02
Block 3	0.041			
MF harm		0.04	0.68	-0.04
MF purity		-0.03	0.74	0.04
Block 4	0.057			
MF Fairness		-0.12	0.13	-0.05
MF Authority		0.14	0.12	0.10
MF Ingroup		0.03	0.74	0.06
MF		0.07	0.42	-0.12
Progressivism				

Table 6: Multiple Linear Regression Model 2

Regression Model 2 (N=563)	R²	B	p	Partial Correlation
Block 1	0.040			
Gender		-0.25	0.01*	-0.16
Ethnicity		0.16	0.07	0.10
Religion		-0.01	0.58	-0.03
Major		-0.02	0.68	-0.02
Political Belief		0.02	0.34	0.05
Block 2	0.056			
MF Fairness		-0.10	0.30	-0.05
MF Authority		0.11	0.19	0.07
MF Ingroup		0.02	0.84	0.01
MF		0.02	0.85	-0.01
Progressivism				
Block 3	0.060			
MF harm		-0.06	0.27	-0.06
MF purity		-0.04	0.28	0.05
Block 4	0.060			
NEP Score		-0.001	0.69	-0.02

Exploratory Results

NEP Subscales. Exploratory statistics were performed to investigate other potential correlations and interactions that were not specifically identified among the hypotheses for this study. After completing the multiple linear regression model for the NEP scale as a whole, regression models were performed for each of the five NEP subscales (growth limit, antianthropocentrism, nature balance, exemptionalism, and ecocrisis) controlling for gender, ethnicity, religion, major, and political view. No significant relations were noted between any of the subscales and meat consumption. Tables of these regression models are included in Appendix D. Although this study focused on harm/care and purity/sanctity, the rest of the moral foundation categories were included in a regression model as noted above. Together, these moral foundations explained an additional 1.4% of the variance. However, this was not statistically significant.

Vegan to Carnivore Scale. As part of the design of this study, the research team developed a novel one-item assessment of self-reported dietary habits regarding animal food intake. This item, the “Vegan to Carnivore” scale, allowed participants to rank their perceived animal food intake along a continuum, from 0, anchored with the term, ‘vegan’ (no animal foods at all), to 10, anchored with the term, ‘carnivore’ (most/all food contains animal products). Figure 2 provides a visual of the comparison between perceived meat consumption and actual meat consumption. There is an overall upward trend in the scale with increasing degrees of carnivore status, however it is interesting to

note that scores dropped down for the strongest carnivore scale item. Figure 3 then shows a visual comparison of participant's ranking on the vegan to carnivore scale in relation to their score on the NEP scale. The NEP scores start to trend up slightly from ranking 5 to 0 (vegan). Pearson correlations conducted with NEP and meat consumption with the vegan to carnivore scale showed significant correlation for both ($p < 0.01$). The NEP and vegan to carnivore scale showed an inverse correlation ($r = -0.145$) whereas meat consumption was positively correlated as would be expected ($r = 0.392$).

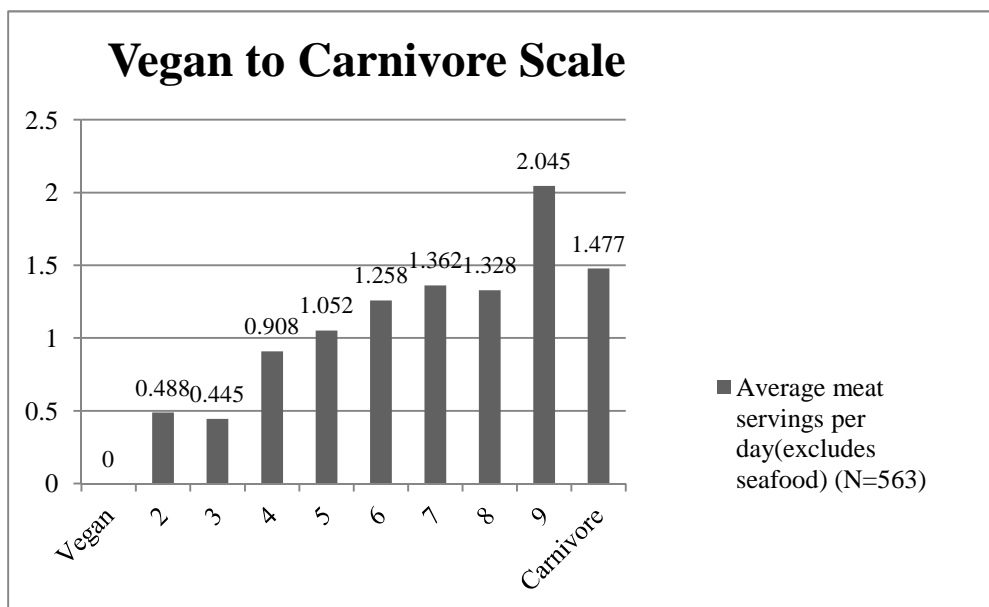


Figure 2: Vegan to Carnivore Scale and Meat Consumption

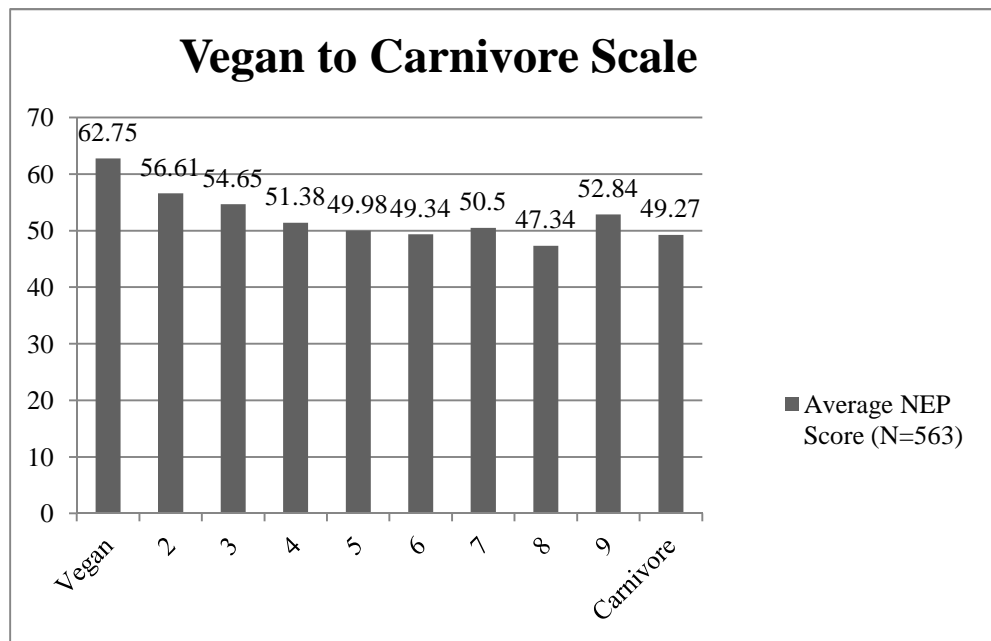


Figure 3: Vegan to Carnivore Scale and NEP Scores

Chapter 5

DISCUSSION

The results of the multiple linear regression model show that there is no predictive relationship among meat consumption, the NEP scale, and the moral foundations of harm/care and purity/sanctity in the sample population surveyed. The NEP scale did show a significant correlation with each of the moral foundations. However, these correlations were modest in strength. Demographics were shown to have the greatest influence on differences found among the variables of interest.

Sample Characteristics

This sample population varied from the general population in a number of ways. The majority of the sample was non-Hispanic White (68%) females (72.7%). Meat consumption was significantly lower for women than for men as well as for non-Hispanic Whites compared to Hispanics, which is consistent with current research (Deshmukh-Taskar et al., 2007; Daniel et al., 2011). Overall meat consumption was lower for this sample (1.17 serv/d) compared to the reported average intake for Americans (2-3 serv/d) (US Census Bureau, 2012). Most participants were in health-related fields of study for their major (65.6%). This may impact overall meat consumption since research has linked high meat intakes with greater risks of health diseases (Zuriek et al., 2004; Kesse-Guyot et al., 2010; Murphy et al., 2012; Pourfarzi et al., 2009). These sample variations may account for finding no significant relationships among the variables in question as well as only finding significant differences among the demographic variables.

Not only are demographics different among this sample, but NEP scores were relatively lower compared with more generalized populations. Willis and Dekay (2007)

measured NEP scores among a more varied population with individuals from government, environment, industry, and the general public with mean NEP score of 54.75 compared to a mean NEP score of 50.25 in this study sample (Willis & Dekay, 2007). The moral foundation scores for harm/care and sanctity/purity were higher than other studies. A large sample of liberals, conservatives and libertarians each scored lower for harm/care and purity/sanctity than that represented in the sample from this study (4.66 harm/care and 3.82 purity/sanctity) (Iyer, Koleva, Graham, Ditto, & Haidt, 2010).

NEP and Meat Consumption

The main purpose of this study was to explore the relationship between meat consumption and ecological attitudes with the hypothesis that meat consumption would be inversely associated with ecological attitudes. This study was the first to explore moral and environmental attitudes related to meat consumption in college students in order to identify such areas for intervention. The results from this study were unable to show a relationship between ecological attitudes and meat consumption. Scores from the NEP scale explained only 0.1% of the variance in the multiple linear regression model. This is consistent with previous research evaluating attitudes surrounding ecological concern which have shown little direct influence on behaviors considered ‘environmentally conserving’ (Amel et al., 2009; Saher et al., 2006; Van Liere & Dunlap, 1978; Levine and Strube, 2012).

Moral Foundations and Meat Consumption

The second hypothesis was if meat consumption was inversely related to the moral foundations of harm/care and purity/sanctity. The results from the study showed no significant relationship between meat consumption and the moral foundations of interest.

These two moral foundations explained no additional variance in the multiple linear regression model. This suggests that meat consumption is not a decision that is associated with harm/care or purity/sanctity. These results conflict with findings from research on the influence of ethics on vegetarianism and disgust often associated with meat consumption. The research suggests that, in general, the growing trend in vegetarianism is based on moral or ethical foundations (Fessler & Navarette, 2003; Fessler et al., 2003; Rozin et al., 1997; Hoffman, Stallings, Bessinger, & Brooks, 2013).

Additional Moral Foundations

Although the rest of the moral foundations were not part of the research hypotheses, they were included in the linear regression model to assess any potential associations. In these exploratory statistics, there were no significant associations found with any of the remaining moral foundations (fairness/reciprocity, ingroup/loyalty, authority/respect, and progressivism) with meat consumption. However, these additional foundations explained more of the variance (1.6%) than did the two variables of interest for our hypotheses (NEP and the moral foundations of harm/care and sanctity/purity). The mean scores for the remaining moral foundations were again higher than mean scores in a larger sample study (Iyer et al., 2010). The characteristics of this sample study are not representative of the general population and interpretation of these results is limited. However, based on the additional variance explained by these foundations, further research on these individually may provide greater clarification of the role of each of these foundations on ecological attitudes and meat consumption.

Limitations

The results from this study cannot be generalized to the public as the sample was composed largely of non-Hispanic white, health-oriented females. The sample was also a convenience sample limited to individuals who were pursuing further education as current college students largely between the ages of 18-30 years. Advertising for the survey was channeled through college department list-serves. Individuals selected themselves for participation in the study as well by choosing to complete the survey. In terms of estimated meat consumption, self-report data gathered from our survey may have suffered from recall bias and social desirability possibly leading to inaccuracy in the results.

Implications for Future Research

The results from this study may help to build a foundation for developing a new construct for changing eating behaviors. Since knowledge about healthy eating behaviors alone is insufficient to produce meaningful changes in eating behavior (Guenther et al., 2006; Stables et al., 2002; Franko, 2008; Poddar et al., 2010), different attitudes and beliefs may be explored to look for motivators that will be more successful in changing those behaviors.

The moral foundations were included in the study since behaviors based on morality often have greater adherence than those that do not. If eating behaviors can be viewed in the context of moral decisions, perhaps greater adherence to dietary behavior change can be elicited. Although this study was unsuccessful in finding a correlation between attitude and behavior, it did provide important insight into the relationship between different attitudes and beliefs. In particular, ecological attitudes were significantly related to all moral foundations based on the results from the Pearson

Correlations. It may be of interest to further explore the relationship between ecological attitudes and the moral foundations.

One aspect of this study was to determine if issues of morality surround the decision making process of eating behaviors, particularly meat consumption. If such a relationship did occur, there would be potential to develop an intervention designed to improve eating behaviors by drawing upon those moral decision processes. This would be an alternative to the less effective approach of knowledge based interventions. However, based on the results from this study and responses from the preliminary qualitative interviews, it appears that morality has varying definitions and meaning to individuals. Developing food behavior interventions based on the moral foundations may not be as effective unless the interventions are tailored to the moral reasoning of each individual or to groups who collectively hold similar moral values. Further research may be warranted to explore this issue.

With the growing trend of vegetarianism, it would be of interest to also compare the moral foundations between vegetarian and non-vegetarian populations. Such research may provide greater insight into which moral foundations are involved, if any, in deciding to remove meat from the diet. It would also prove useful to compare scores for the moral foundations and reasons reported for becoming vegetarian. The exploratory statistics conducted on the NEP and meat consumption in regards to the Vegan to Carnivore scale showed significant correlations between self-identified labels (vegan/carnivore). How individuals identified their general relationship with meat consumption was highly reflective of actual eating behavior. According to these results,

self identity may be a more reflective measure of actual behavior, at least in relation to actual meat consumption and perceived meat consumption.

Conclusion

This study related ecological and moral attitudes of college students with daily meat consumption. No relationships were found among these variables. However, due to the dominance of particular demographics in the sample, it is possible that potential relations could exist in samples with higher demographic variability. Future research should include samples of greater diversity to further explore potential relations. If such relations can be identified, intervention studies can be designed targeting moral or environmental attitudes in relation to meat consumption.

Additional statistics revealed potential relationships between ecological attitudes and moral foundations. Further research is warranted in this area to better understand the relationship between the two. Self-identified labels of relative meat intake were good predictors of actual meat consumption based on the novel self-identified vegetarianism scale (Vegan to Carnivore Scale). Further studies are needed to establish the validity and consistency of this measure.

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APPENDIX A

QUALITATIVE INTERVIEW CONSENT FORM

INFORMATION LETTER-INTERVIEWS, GROUP INTERVIEWS, or FOCUS
GROUPS

Food and morality study – development

10/31/11

Dear Participant:

I am a professor in the School of Nutrition and Health Promotion at Arizona State University. I am conducting a research study to explore how morality and food are related.

I am inviting your participation, which will involve any one of the following options (a) semi-structured interviews; (b) focus groups; (c) participant observation in an eating; and/or d) user testing/feedback on preliminary prototypes of interventions focused on morality and food. You will have the option to participate in as many or as few options as you so choose. Each task listed above will take between 20 minutes to 1 hour each. For your involvement you will be offered a small \$5 gift card. You have the right not to answer any question, and to stop participation at any time.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty, for example, it will not affect your grade. You must be 18 or older to participate in the study.

Although there is no benefit to you possible benefits of your participation are the identification of new insights on ways to promote healthful eating among college students. There are no foreseeable risks or discomforts to your participation.

Your responses will be confidential. The results of this study may be used in reports, presentations, or publications but your name will not be used.

I would like to audio/videotape this interview. The interview will not be recorded without your permission. Please let me know if you do not want the interview to be taped; you also can change your mind after the interview starts, just let me know. These audio/video tapes will be stored on a password-protected computer in my locked lab space in a locked room within a locked and guard protected building (ABC1) on the ASU campus.

If you have any questions concerning the research study, please contact the research team at: Eric Hekler, ehekler@asu.edu, or 6028272271. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

By signing below you are agreeing to participate in the study.

Signature

Date

By signing below, you are agreeing to be taped.

Signature

Date

APPENDIX B

QUALITATIVE INTERVIEW QUESTIONS

1. What is your major?
2. Do you have any religious affiliation, if any?
3. Are you, or have you ever been, any type of vegetarian?
4. If you were to participate in a study that required you to provide your opinion about a topic, how would you prefer to provide your response? Written, spoken, survey or interview?
5. As part of a study, would you be willing to write a one to two paragraph essay?
6. How comfortable do you feel with public speaking on a scale of one to five, one being very comfortable and five being very uncomfortable?
7. How comfortable do you feel with debate on a scale of one to five, one being very comfortable and five being very uncomfortable?
8. What does morality mean to you?
9. What comes to mind when I say “moral eating”?
10. How do you feel about people who are extremely obese?
11. What about individuals who are extremely thin?
12. How do you feel about people who are vegan?
13. What do you think about junk food taxes, requirements to post calorie information, or the government putting restrictions on food consumption or purchasing?
14. If all vending machines were removed in an effort to discourage unhealthy eating, what would be your opinion/feelings about that?
15. Do you think it is the government’s responsibility to control food in the market?
16. Do you think we should all pay the same for health care regardless of lifestyle choices? Why or why not?

17. When you are eating, how much do you think about where your food comes from or what it is made of?
18. How many times per day or week do you eat meat?
19. What does sustainable eating mean to you?
20. Do you find sustainability important in your food choices?
21. How influential do you think your food choices are on your friends' choices and vice versa?
22. How important is it to you to support your community by buying local?

APPENDIX C
IRB APPROVAL

IRB APPROVAL



Office of Research Integrity and Assurance

To: Eric Hekler

From:  Mark Roosa, Chair
Soc Beh IRB 

Date: 10/31/2011

Committee Action: Exemption Granted

IRB Action Date: 10/31/2011

IRB Protocol #: 1110007008

Study Title: Food and morality study

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2).

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

APPENDIX D

NEP SUBSCALE LINEAR REGRESSION MODELS

NEP SUBSCALE LINEAR REGRESSION MODELS

Growth Limit (N=563)	Adjusted R²	B	p	Partial Correlation
Block 1	0.040			
Gender		-0.16	0.007*	-0.16
Ethnicity		0.10	0.11	0.10
Religion		-0.02	0.78	-0.04
Major		-0.04	0.48	-0.07
Political Belief		-0.01	0.97	0.04
Block 2	0.044			
Growth Limit		0.08	0.20	-0.03
Block 3	0.044			
MF harm		0.04	0.64	-0.04
MF purity		-0.02	0.83	0.04
Block 4	0.060			
MF Fairness		-0.13	0.13	-0.05
MF Authority		0.14	0.13	0.10
MF Ingroup		0.03	0.76	0.06
MF		0.07	0.73	-0.12
Progressivism				

Anti- anthropocentrism (N=563)	Adjusted R²	B	p	Partial Correlation
Block 1	0.040			
Gender		-0.15	0.01*	-0.16
Ethnicity		0.11	0.83	0.10
Religion		-0.02	0.72	-0.04
Major		-0.04	0.53	-0.07
Political Belief		-0.01	0.88	0.04
Block 2	0.040			
Anti- anthropocentrism		0.01	0.93	-0.03
Block 3	0.040			
MF harm		0.05	0.59	-0.04
MF purity		-0.05	0.64	0.04
Block 4	0.055			
MF Fairness		-0.12	0.16	-0.05
MF Authority		0.14	0.13	0.10
MF Ingroup		0.03	0.75	0.06
MF		0.07	0.73	-0.12
Progressivism				

Nature Balance (N=563)	Adjusted R²	B	p	Partial Correlation
Block 1	0.040			
Gender		-0.15	0.01 [*]	-0.16
Ethnicity		0.10	0.87	0.10
Religion		-0.02	0.74	-0.04
Major		-0.04	0.48	-0.07
Political Belief		-0.01	0.91	0.04
Block 2	0.040			
Nature Balance		0.04	0.54	-0.03
Block 3	0.041			
MF harm		0.04	0.61	-0.04
MF purity		-0.04	0.65	0.04
Block 4	0.056			
MF Fairness		-0.12	0.14	-0.05
MF Authority		0.14	0.13	0.10
MF Ingroup		0.03	0.73	0.06
MF		0.07	0.73	-0.12
Progressivism				

Exemptionalism (N=563)	Adjusted R²	B	p	Partial Correlation
Block 1	0.040			
Gender		-0.15	0.01 [*]	-0.16
Ethnicity		0.11	0.08	0.10
Religion		-0.02	0.71	-0.04
Major		-0.04	0.51	-0.07
Political Belief		-0.01	0.89	0.04
Block 2	0.040			
Exemptionalism		0.02	0.80	-0.03
Block 3	0.040			
MF harm		0.04	0.59	-0.04
MF purity		-0.05	0.62	0.04
Block 4	0.055			
MF Fairness		-0.12	0.16	-0.05
MF Authority		0.14	0.13	0.10
MF Ingroup		0.03	0.75	0.06
MF		0.07	0.73	-0.12
Progressivism				

Ecocrisis (N=563)	Adjusted R²	<i>B</i>	<i>p</i>	Partial Correlation
Block 1	0.040			
Gender		-0.15	0.01 [*]	-0.16
Ethnicity		0.10	0.09	0.10
Religion		-0.02	0.74	-0.04
Major		-0.04	0.51	-0.07
Political Belief		-0.003	0.97	0.04
Block 2	0.040			
Ecocrisis		0.03	0.66	-0.03
Block 3	0.040			
MF harm		0.04	0.61	-0.04
MF purity		-0.04	0.65	0.04
Block 4	0.056			
MF Fairness		-0.12	0.14	-0.05
MF Authority		0.14	0.13	0.10
MF Ingroup		0.03	0.73	0.06
MF		0.07	0.73	-0.12
Progressivism				