INCORPORATING ENVIRONMENTAL CONCERNS INTO DECISIONS ABOUT FOOD: CONTRIBUTIONS FROM RESEARCH ON DECISION-MAKING

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ABSTRACT

INCORPORATING ENVIRONMENTAL CONCERNS INTO DECISIONS ABOUT FOOD: CONTRIBUTIONS FROM RESEARCH ON DECISION-MAKING

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This dissertation research addresses the issue of how to incorporate concerns about the health of the environment into food decisions, be they the small choices we make every day or the much larger decisions relating to what foods should be served in a university or made available within a community. This research takes as its starting point insights from the interdisciplinary fields of behavioral decision research and decision analysis, which suggest why it may be challenging to make decisions that are in line with these goals, e.g., the systematic shortcuts and biases that tend to pervade our decision-making (often without our awareness), as well as what approaches we can take to account for these short-cuts and biases, e.g., structured decision-making and behavioral interventions. The context for this research is Michigan State University's (MSU) Environmental Stewardship program, which is charged with exploring all aspects of the university's approach to sustainability and has the ultimate goal of reducing the university's environmental footprint. The university's food system is well positioned to make contributions towards the achievement of a broad range of health and environmental sustainability outcomes, and provided an ideal context within which to apply emerging ideas from behavioral decision research and decision analysis.

The research for this dissertation unfolded in two complementary phases. First, key objectives that MSU students associate with their food choices on campus were

documented using a semi-structured open-ended interview protocol, with an eye to identifying and elucidating how objectives relating to environmental health and sustainability factor into student food choices (if at all). Second, a factorial experimental design was used to compare a behavioral intervention that presented students with meat-free menu items as the default option (representing a more pro-environmental choice) with the provision of information linking less meat consumption with positive environmental outcomes. Several social psychological and demographic factors were incorporated into the design of the experiment as well. In terms of the first phase of research, students discussed objectives relating to taste, health, enjoying the dining experience, and safety, and this is in keeping with what has been found in other studies. Connections between food and environmental sustainability, e.g., through food overproduction and waste, dining hall practices, organic food, local food, modern food production practices, and the implications of raising animals for food, were also noted. In terms of the second phase of research, logistic regression analysis revealed that the default menu configuration was a significant predictor of choice of a meat-free menu item; the presence of information was not a significant predictor of choice. In addition, neither an individual's values or worldview contributed directly to the model; only gender was a significant additional predictor of meat-free meal choice.

Default interventions and other behavior-based decision-structuring efforts can be important tools in motivating pro-environmental behavior, and can also serve to complement information and education efforts over the long term, as long as concerns about individual autonomy are addressed.

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CHAPTER 1

Introduction

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The campus Environmental Stewardship program at Michigan State University (MSU) is charged with exploring all aspects of the university's approach to sustainability – including its system of food procurement and presentation – with the ultimate goal of reducing the university's environmental footprint. It should be acknowledged that a broad consensus on the definition and interpretation of 'sustainability' in general, and environmental sustainability in particular, has yet to be achieved (Aiking & de Boer, 2006; Robinson & Smith, 2002; Thompson, 2007). The university's environmental stewardship program, however, operationalizes sustainability in terms of systemic efforts that will ultimately lead to measurable reductions in greenhouse gas emissions and resource use (e.g., energy, water and land – often represented by indices like the 'environmental footprint'), as well as address other issues like habitat loss, and degradation of air, water, and soil quality.

Over 15,000 students live in the residence halls on Michigan State University's campus, and the university's Residential and Hospitality Services (RHS) team serves over 35,000 meals per day. Thus, the university's food system is well positioned to make contributions towards the achievement of a broad range of health and environmental sustainability outcomes. This provided an ideal context within which to apply emerging ideas from behavioral decision research and decision analysis on food choice and decision-making, and formed the basis of original research for this PhD dissertation. Specifically, insights from behavioral decision research and decision analysis can help to shed light on why, despite professed intentions to make choices that are healthier, more environmentally benign, or more ethical, we often have difficulty fulfilling these

objectives; as well as what concrete steps can be take to better match decision outcomes with these important objectives.

The research for this dissertation unfolded in two complementary phases. *First*, key objectives that MSU students associate with their food choices on campus were documented, with an eye to identifying and elucidating how objectives relating to environmental health and sustainability factor into student food choices (if at all). *Second*, the application of information provision and a default behavioral intervention designed to achieve some of the food and environment related objectives identified by students and RHS staff alike, was tested within the framework of a controlled field experiment.

In the first phase of this research, focus group and interview sessions – using a semi-structured open-ended interview protocol – were used to gather a full range of students' objectives relating to food choice. A structured decision-making framework provided guidance in the identification and organization of students' food-related objectives into a means-ends objectives network (Gregory, 2000; Keeney, 1996). The structured objectives networks which emerged out of these discussions provided not only a visual representation of the food-related objectives of student participants (and the connections between these objectives), but also allowed for a ready comparison among the different groups of participants in this study (both randomly recruited students, as well as students purposively recruited out of campus environmental and alternative agriculture programs). Student's connections between food and environmental issues

also emerged out of these discussions. This, together with the means-ends objectives network, provides valuable information for RHS in terms of what students are ultimately seeking with their food choices, as well as in terms of where information and dialogue may be necessary to expand and clarify connections – wherever possible – between the foods served in MSU's dining halls and potential environmental outcomes. Students' food- and environment-related objectives also informed the experimental test of behavioral and informational interventions intended to promote environmentally sustainable food choices (the second phase of this research).

In the second phase of this research, a factorial experimental design was used to compare the efficacy of a default behavioral intervention in motivating choice of a meat-free menu item with: (i) the provision of information on these same menu options, and (ii) key social psychological and demographic factors. More specifically, the behavioral intervention presented students with a meat-free menu option as the *default* (convenient) option, whereas the information provided to study participants drew a link between consuming less meat with positive environmental outcomes. Finally, participants' Universalistic Value Orientation (de Groot & Steg, 2008; Schwartz, 1996; Stern, Dietz, & Guagnano, 1998), endorsement of the New Ecological Paradigm (Dunlap, Van Liere, Mertig, & Jones, 2000), and Gender were also included as additional motivators of a meat-free meal choice. These social psychological and demographic factors have traditionally been associated with pro-environmental behaviors.

Thus, the ultimate goal of the experiment was to test the efficacy of defaults in motivating behavior change towards a pro-environmental outcome (in this case, choosing a meat-free menu item). Indeed, defaults as a type of behavioral intervention have been used successfully in a variety of pro-social and pro-environmental of contexts, including (i) motivating healthier food choices in a fast food restaurant (Downs, Loewenstein, & Wisdom, 2009), (ii) facilitating the selection of 'green energy' sources for home energy provision (Pichert & Katsikopoulos, 2008), (iii) encouraging organ donation (Johnson & Goldstein, 2003), and (iv) increasing employee savings and enrolment into employer-sponsored retirement programs (Thaler & Benartzi, 2004). To date, a default intervention has yet to be applied to a food choice setting to facilitate more 'environmentally-friendly' food choices.

Campus environmental sustainability efforts provide the immediate context for this dissertation research. However, the insights achieved through this study can be applied to other facets of food choice, e.g., promoting healthy or ethical food choices; in encouraging pro-environmental behavior in other domains, e.g., recycling, energy and water conservation; as well as helping to clarify our understanding of when – and how – behavioral interventions like nudges and defaults are most efficacious.

This dissertation is organized into three main Chapters. Chapter 2, entitled 'Improving decision-making about food: Contributions from research on decision-making', functions as a review and describes some key contributions to our understanding of human decision-making (particularly within the realms of food choice and pro-environmental

behavior) from the interdisciplinary fields of behavioural decision research and decision analysis. This chapter also provides background information for the research presented in Chapters 3 and 4.

Chapter 3, entitled 'Student objectives relating to food choice: An exploratory focus group and interview-based study', details the results of the first phase of research for this dissertation (as described above); and Chapter 4, entitled 'Motivating pro-environmental food choices: The role of value orientation, information provision, and a default behavioural intervention' describes the field experiment (the second phase of this research). Chapter 5, the Conclusion, further summarizes these findings and makes suggestions for future research efforts.

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CHAPTER 2

Improving decisions about food: Contributions from research on decision-making

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Abstract

Making decisions about what food to eat can be difficult for anyone. These difficulties arise not only because of the multiple concerns and objectives that must be addressed, but also because of the common shortcuts and biases that may come into play when making a choice, and the often undetected influence of context and emotional response. Informational and educational campaigns are commonly used to help consumers make 'better' decisions about food, e.g., encouraging healthier, more environmentally friendly, or more humane choices through the use of labels, posted calorie counts, and web-based campaigns, but their effectiveness has been challenged of late. The interdisciplinary fields of behavioral decision research and decision analysis – including psychology, social psychology and behavioral economics – provide important insights into why we may have difficulty with decisions as supposedly as familiar as what to eat, as well as the type of decision support that can help to navigate these complex choices. For this chapter, five decision-related principles to better inform and support decisions about food are described. These principles include (i) the constructive nature of food preferences, (ii) the clarification of decision objectives, (iii) the identification of attributes (measures) for those objectives, (iv) making the consequences of choices more apparent, and (v) the role of scale in informing the design and implementation of decision support tools. Ultimately, there are a host of decision support approaches and behavioral interventions available to improve the quality of decision-making, and account for the biases and unhelpful shortcuts that may prevent us from achieving our goals and objectives – food-related or otherwise.

1. Introduction

Deciding what food to place on our tables each day has become an increasingly difficult question. In addition to simply satisfying our hunger, decisions about food have come to encompass a host of other considerations, such as efficiency of preparation, comfort and familiarity, cultural traditions, cost and budgetary constraints, and – of course – pleasure and taste. More recently, concerns about the healthfulness of food, as well as the environmental, ethical, and social costs of food production have been added to this list. Yet, our ability to deal with the complexity and amount of information has not grown commensurately. While we continue to rely heavily on consumer education to help bridge this gap, the interdisciplinary fields of behavioral decision research and decision analysis – including psychology, social psychology and behavioral economics – provide important insights into why we may have difficulty with decisions as supposedly as familiar as what to eat, as well as the type of decision support that can help to navigate this complexity. This chapter will thus review some short-cuts and biases associated with the decision-making process that can interfere with the ability to address desired health, ethical, or environmental goals within the realm of food choice, and describe some key steps that may be taken to address these challenges, i.e., through the use of a variety of decision aiding techniques.

2. Background

From the standpoint of human health, the type and amount of food that people eat has been linked to increased obesity rates, cardiovascular disease, and diabetes; with large portion sizes, highly processed, and fat and sugar-laden options being the prime culprits

(Harris, Pomeranz, Lobstein, & Brownell, 2009; Neff, Palmer, McKenzie, & Lawrence, 2009; Rolls, 2003; Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008). At the same time, these so-called "energy intensive" foods (e.g., meats and highly processed pre-packaged foods) have been associated with disproportionate resource use, which include significant fuel and fertilizer inputs, and a strain on water resources and arable land (Blair & Sobal, 2006; Gerbens-Leenes & Nonhebel, 2002; Peters, Wilkins, & Fick, 2007; White, 2000). The industrial production of annual field crops and animal products has also been linked to climate change, degradation of air and water quality, and habitat destruction (Carlsson-Kanyama, 1998; McAlpine, Etter, Fearnside, Seabrook, & Laurance, 2009; Naylor et al., 2005; Smil, 2002). Adding to this long list of concerns are those related to community stability and welfare, the ethical profile of food (e.g., how farm workers and food animals are treated), and the life cycle or carbon footprint of particular food options.

Thus, once relatively simple decisions about what to eat have grown markedly in complexity. No longer are people just concerned about finding foods that are easy to prepare, healthy, and good tasting. Instead, foods must be all of these things—easy to prepare, healthy, good tasting—*and,* in the view of some, also good for communities, carbon neutral, sustainably produced and sourced, welfare friendly, etc. Recognizing this as an opportunity, and a need, to better inform people's decisions about food, food movements and related organizations have been working to develop alternatives to the industrial food stream. Food movement organizations have also provided recommendations and guidance to individuals and policy makers alike (Allen,

FitzSimmons, Goodman, & Warner, 2003; Clancy, 1997; Cone & Myhre, 2000; Feenstra, 1997; Henderson, 1998). Food advocacy groups, for example the Organic Consumers Association, Slow Food, or the Grace Communications Foundation, have promoted a variety of solutions, e.g., the adoption of local, organic, fair trade, and pasture-raised foods, as potential means of addressing some of the concerns outlined above. More recently, First Lady Michelle Obama has spearheaded the 'Lets Move' campaign to promote healthier eating practices, generate a sense of community around food, and combat the alarming rise in childhood obesity[1].

In short, the alternative food movement has excelled at incorporating a range of concerns relating to food choice into the public discourse, in addition to promoting new ways for people to think about their relationship with food, food production, and food provisioning. One of the primary means of articulating these alternative perspectives to individuals has been through print and web-based education and information campaigns[2], food labeling, and the promotion of certain options through farmers' markets and community-supported agriculture (Brodt, Feenstra, Kozloff, Klonsky, & Tourte, 2006; Cone & Myhre, 2000; DeLind, 2002; Howard & Allen, 2006). The dizzying diversity of foods now available in grocery stores and restaurants are all testament to the effectiveness of these efforts, not to mention the proliferation of organic and community agriculture programs at universities and colleges, artisanal food production,

[1] www.letsmove.gov, last accessed January 23, 2011

[2] For example, www.sustainabletable.com, www.organicconsumer.com, or www.sierraclub.org/truecostoffood/ last accessed January 24, 2011.

as well as the incorporation of organic, local, regional, and vegetarian options into the menu at many universities and in public schools.

However, despite these important steps forward, there are reasons to be concerned about people's ability to (i) incorporate new information about the food system into their decision-making and, ultimately, (ii) navigate what is becoming an increasingly complex landscape of food options. Underlying these concerns is a large body of research on human judgment and decision making which demonstrates that people have significant difficulties when it comes to making choices among decision options, particularly when faced with making tradeoffs among closely held objectives or values (Gregory, 2002; Keeney, 1996; Tetlock, Kristel, Elson, Green, & Lerner, 2000), e.g., choosing among foods that are healthy or humane – but boring, vs. foods that are delicious or convenient – but which have negative consequences for personal health, the health of the environment or the welfare of animals. When faced with difficult decisions and competing objectives, people may instead ignore or avoid the choice altogether (Fiske & Tetlock, 1997; Kunreuther et al., 2002) or adopt a simplifying decision strategy, i.e., a lexicographic decision rule, where options are evaluated on only the most salient attribute(s) until a clear choice emerges (Scheibehenne, Miesler, & Todd, 2007).

Making matters worse, the routine nature of decision-making about food is likely to exacerbate this problem as people – when making food choices – may fall back on familiar choices and habit rather than a careful consideration of the pros and cons of competing options (Biel, Dahlstrand, & Grankvist, 2005; Goldsmith, Freiden, &

Henderson, 1995; Tarkiainen & Sundqvist, 2009). Moreover, related research has shown that the provision of information or the presence of educational materials alone is insufficient to help people to cope with these difficulties (Downs et al., 2009; Just & Payne, 2009; Ratner et al., 2008; Verplanken & Wood, 2006).

Despite these challenges, finding ways to help decision makers both deal with the complexities inherent in the modern food system – and make choices that result in better outcomes across the broad variety of food-related concerns – is of acute importance. To this end, I view the barriers to better food choices through the lens of behavioral decision research, an interdisciplinary field that includes work from psychology, social psychology and behavioral economics. Taking this view, many of the obstacles routinely encountered by people during the process of food decision making stem from the absence of a proactive decision support strategy that helps them to account for their own values, scientific, ethical, or environmental considerations. These obstacles also stem from the systemic decision-making biases that interfere with one's ability to carefully consider information and make decisions with better social, health or environmental outcomes.

In this chapter I describe five decision-related principles – each one building on the information that precedes it – that may be utilized by consumers, researchers and practitioners, to better inform and support decisions about food. These principles include (i) the constructive nature of food preferences, (ii) the clarification of decision objectives, (iii) the identification of attributes (measures) for those objectives, (iv)

making the consequences of choices more apparent, and (v) the role of scale in informing the design and implementation of decision support tools. Wherever possible, food related examples will be drawn and, although the overall theme of this chapter is the environmental implications of our food choices, work related to human health and welfare will also be utilized. Indeed, many of the approaches that are currently being employed to encouraging people to eat healthier may also be applied to encouraging more environmentally responsible food choices (or a myriad of other individual choices and behaviors).

3. Improving Decision-making about Food: Five Principles from Behavioral Decision Research

3.1 Preferences about food are labile and constructive in nature

In many of today's societies, people are presented with hundreds – if not thousands – of food options. When selecting among the available options, people may consult underlying or pre-existing preferences during decision-making (Lichtenstein & Slovic, 2006; Slovic, 1995). Some of these preferences are quite broad, as in the case preferring to prepare and eat simple home-style meals as opposed to tackling complex recipes with exotic ingredients. Other preferences tend to be much more specific, like preferring eggs from free-range chickens to mass-produced eggs. However, even for food decisions we may consider routine, these preferences can be extremely labile or may not exist at all.

Within a particular decision context, how the alternatives are presented or framed may result in dramatic shifts in preference and, ultimately, choice. For example, a recent study illustrated how preference for coffee was influenced by whether the accompanying condiments were served in chipped Styrofoam cups (the coffee was rated less favorably) or elegant crystal decanters (the coffee was rated more favorably) (Bertini, Ofek, & Ariely, 2009). Preferences for foods have similarly been shown to be sensitive to such cues as the information on the label, e.g., sandwiches were rated less favorably when labeled as 'low fat' (Wardle & Solomons, 1994), or whether the ingredients were revealed before or after the food is consumed, e.g., the presence of vinegar in a sample of beer resulted in negative evaluations of that beer only when subjects were told of the additive *before* consuming the beer (as opposed to being told *after* consuming the beer) (Lee, Frederick, & Ariely, 2006).

People can also form a preference for foods simply because of their familiarity or fluency with brand symbols or labeling. Labroo et al. (2008) increased preference for wine with a frog on the label simply by priming subjects with the word 'frog'. Similarly, Ferraro et al. (2009) showed that incidental exposure to a particular brand of bottled water increased subjects' preference for that brand. Familiarity with the taste of foods is also associated with increased preferences for those foods, even if the initial experience was incidental and/or cannot be directly recalled by the person (Ariely & Norton, 2009; Koster, 2009). Research by Brian Wansink and colleagues has repeatedly illustrated the often overwhelming influence of physical cues, e.g., plate, bowl, and package size, on the amount of food consumed (Wansink, 2004). Not

surprisingly, this same research team highlighted the common grocery store tactics of multiple unit pricing and high purchase quantity limits in stimulating the purchase of greater quantities of these items (Wansink, Kent, & Hoch, 1998). In other words, selling cans of soup at 2 for $1.00 caused greater quantities to be sold than when soup was priced at $0.50 per can. The authors attributed this phenomenon to consumers anchoring on these suggestions without sufficient adjustment for their own needs (see also Tversky & Kahneman, 1974). Finally, in a classic study of the endowment effect (Kahneman, Knetsch, & Thaler, 1991; Knetsch, 1996), a randomly assigned chocolate bar was imbued with greater value simply because it was in the current possession of some study subjects – illustrating a key mechanism behind the power of the status quo option in decision-making of all kinds (for more on this see Section 3.5 of this Chapter, and Chapter 4) (Kahneman et al., 1991).

An individual's affective or emotional state at the time of judgment may also cause instability in people's food preferences. Specifically, making decisions when in an aroused or "hot" state such as when hungry is often associated with the selection of options that provide immediate satisfaction (e.g., a greasy cheeseburger with French fries and a large soda) at the expense of other options that may not be as immediately pleasurable but which provide longer-range benefits (e.g., a hearty lentil stew with a glass of water) (Loewenstein, 1996; Read & van Leeuwen, 1998). Both time pressure and increased cognitive load – for example the stress brought on by having to contend with these conflicting objectives, a wide array of options, or a large amount of information -- exacerbate this problem (Loewenstein, 1996; Milkman, Rogers, &

Bazerman, 2008a; Shiv & Fedorikhin, 1999). Indeed, anyone who has visited a restaurant while hungry is acutely aware of this phenomenon; the best-laid plans to adhere to one's diet quickly crumble in the face of delicious and exotic menu options.

In each of these cases, people are unable to evaluate choices and alternatives by simply drawing upon stable, preexisting preferences. Instead, they must *construct* their preferences—and by extension, the decisions that result from them—on the spot, largely in response to cues that are available to them during the decision-making or elicitation process itself (Lichtenstein & Slovic, 2006). The implications of preference construction for decisions about food are far reaching. But at the most basic level, this view of constructed decision making calls into question the generally accepted tenet in many advocacy circles that teaching people about the benefits of certain foods and food systems will de facto lead to better decisions (Bissonnette & Contento, 2001; Lea, 2005; Robinson & Smith, 2002). This is not to suggest that education is a fruitless exercise; a well-informed and active decisions maker, i.e., one who evaluates the pros and cons of different food options – *should* be preferred to an uninformed one. However, education and advocacy alone cannot account for the psychological tendencies and constraints that shape many decisions about food.

The principle of constructed preferences is linked to two different approaches to helping people work through complex and/or emotionally fraught decisions, these are known as (i) structured decision-making or decision aiding (Gregory, 2000; Keeney, 1996) and (ii) choice architecture (Thaler & Sunstein, 2008). The decision-structuring approach

explicitly addresses systematic biases in decision-making by structuring the decision-making *process,* i.e., breaking decisions down into manageable steps and highlighting (and hopefully avoiding) where many of these counterproductive biases and short cuts come into play. 'Choice architecture' or 'nudging' instead structures the decision-making *environment* to take advantage of the inevitable biases and short cuts that are a part of many decisions; in other words, manipulating the decision environment so that contextual cues and the presentation of options make it easier for people to make choices that are more in their self-interest. The remaining sections in this chapter will outline four additional principles of decision support that stem from work on decision aiding and choice architecture and – ultimately – the constructive nature of preferences. These principles are (i) the clarification of decision objectives, (ii) the identification of measures for those objectives, (iii) making the consequences of our choices more apparent, and (iv) matching the scale of decision support to the decision at hand.

3.2 Identify what matters to people in decisions about food: Clarify objectives

The sensitivity of decisions to contextual cues – and food choice is no exception – suggests that an overall framework for decision making may be needed to help the decision-maker navigate complex issues. Decision aiding approaches, e.g., structured decision-making, help people address complex decisions by first shifting decision makers *away* from a focus on existing patterns of behavior or specific alternatives *to* a focus instead on the full range of individual (or organizational) objectives and values that are associated with that decision (Keeney, 1996).

Choosing among existing alternatives artificially limits the decision-maker to the objectives and outcomes that are associated with these alternatives, as opposed to proactively creating a set of decision criteria (objectives and values) and then systematically assessing how well the existing options meet these criteria (if at all) (Hammond, Keeney, & Raiffa, 1999; Keeney, 1996). The restrictive and narrow focus of alternative-focused thinking can also lead to some of the decision-making biases described previously, e.g., an overreliance on our affective reaction to alternatives, preference for an alternative because of a sense of familiarity or salience (even if only arbitrarily established), or an adherence to the status quo to avoid confronting the decision altogether.

Spending time identifying and clarifying a comprehensive set of objectives has been identified as one of the most important steps in structured decision-making (Gregory & Keeney, 2002; Keeney, 1988, 1996), and yet it has not been fully explored in much of food and agriculture research (but see examples below). This process establishes what is important (in terms of objectives and underlying values) for individuals and/or stakeholders in a particular decision-making context, and these objectives are then used to evaluate decision options later on. While this process can be as simple as an individual jotting down everything that they would like to achieve for a particular decision, the elicitation of objectives can also occur in a group setting where a cross-section of participants – or stakeholders – can share and discuss what matters to them. The goal of the objectives elicitation process is to create as complete a list as possible of what an individual or group wishes to achieve in a particular decision context

(adapted from Hammond et al., 1999; Keeney, 1996). More specifically, in structured decision-making efforts, objectives are defined as both what is important for an individual to achieve ('what matters') in a particular decision context, as well as a reflection of the values, concerns, beliefs, and aspirations that also play a role in these decisions (Gregory, McDaniels, & Fields, 2001; Hammond et al., 1999)[3].

The importance of identifying objectives before making a choice or addressing a particular decision problem can be illustrated with two food-related examples. First, while grocery stores and food service providers often present us with a breathtakingly wide variety of products, this breadth of choice can be illusory. The food retail sector is increasingly dominated by a small number of national and global actors, and these firms – in turn – exert increasing control over the brands and products that are offered in grocery stores, restaurants, and other food retailers (Burch & Lawrence, 2005; Heffernan, Hendrickson, & Gronski, 1999; Hendrickson, Heffernan, Howard, & Heffernan, 2001; Howard, 2009). Thus, when we shop for food, we are making choices among a limited subset of food products, and therefore a limited conceptualization of 'what matters' in that particular choice (or someone else's conceptualization of what matters). Indeed, if we don't take the time to really think about what objectives are important when deciding the kinds or amounts of food to eat, then food producers and

[3] Objectives are then further differentiated according to whether they are 'means' or 'fundamental'. Means objectives are categorized as such because they help to achieve other, more fundamental, objectives. Fundamental objectives – also referred to as 'ends' objectives – represent more abstract values or goals that are, in and of themselves, important (Keeney, 1996; Keeney & McDaniels, 1999). Further differentiation of these objectives is discussed in Chapter 3.

retailers will continue to provide consumers with their own characterizations of 'value-priced', 'tasty' or 'convenient' foods, not to mention their narrow formulations of green, animal-friendly, or healthy products. For example, much of the 'organic' milk sold at large retailers is from factory-style dairy operations that allow cows only limited access (if any) to pasture – although a recent ruling by the US Department of Agriculture may halt this practice (Cornucopia Institute, 2010).

By way of a second example, the production of local and organic foods was originally embraced as a means of counteracting the environmental and social ills associated with industrial agriculture (Clancy, 1997; Feenstra, 1997; Henderson, 1998). Yet, while these 'alternative' forms of agriculture have gained acceptance across a considerable cross-section of society, they have also come under criticism for the negative issues that have been exacerbated or ignored altogether. For example, local food has been criticized for it's potential for insularity and lack of attention to issues of social justice (Hinrichs, 2003), and for not living up to claims of environmental sustainability – particularly in the realm of contributions to climate change (Weber & Matthews, 2008). Similarly, organic food production has come under scrutiny because of the growing dominance of large-scale producers (Howard, 2009), or for the liberal application of the organic label to everything from sugary cereals to highly processed ready-to-eat foods. From the perspective of decision analysis and research, these issues have arisen partly because insufficient attention was paid to clarifying the values, goals and objectives associated with food production (and consumption). Put another way, problems associated with modern food production and consumption practices are better viewed

as opportunities to take a step back and carefully delineate all that we wish to achieve within this domain and then begin to systematically assess and put into practice the means of reaching these objectives. Failing to do so will mean a continued and unhelpful focus on an overly narrow set of existing alternatives (Keeney, 1996).

Food system studies that have elicited and identified objectives in a structured way have shown promise in terms of expanding the list of considerations around food beyond the narrow prescriptions offered by the modern food system. Kloppenburg et al. (2000) asked a diversity of participants to define what the term 'sustainable food system' meant to them, and were able to identify a list of attributes relating to food production and consumption. These included such characteristics as "participatory", "healthful", "just/ethical", and "sustainably regulated", and the authors saw this as a way to move past "formulations of food system sustainability [that] have been constructed around a narrow set of elements, by a narrow set of analysts" (p. 184). Similarly, Allen and Hinrichs (2007) sought to clarify the program objectives of local food projects, e.g., relating to environmental, aesthetic or community benefits and outcomes, with an eye toward determining how well these campaigns are able to operationalize and achieve these objectives. Finally, in a recent paper, Gregory and Gregory (2010) make the argument that the difficulties communities have had in establishing alternative food systems in the face of modern industrial agriculture and food provisioning lies – in part – with the lack of a comprehensive and clearly articulated list of objectives that a community would like to achieve through their food system, e.g. to make residents healthier or to accommodate First Nation and other cultural practices. These authors

suggest that communities interested in establishing a credible and workable alternative to the industrial food stream spend time eliciting objectives from a wide variety of stakeholders before deciding which form of agricultural production (or combination of production practices), e.g., local, community, supported, niche gourmet, best meets their needs.

3.3 Measure what matters: Assigning attributes to objectives

> One of Lora Jordan's clients came to her recently with what she thought was good news. She had given up sugary snacks and was now munching on raw almonds throughout the day instead. That's good, right? Well, that depends, says Ms. Jordan, a Toronto-based nutritionist. How many almonds? A full cup, it turned out. Not so good. "That's about 800 calories" – about two-thirds of the woman's recommended daily caloric intake, Ms. Jordan says. It's proof that going by gut feel can sometimes wind up leaving you with more gut to feel (McGinn, 2011).

This very simple example illustrates the importance of not only setting decision objectives (in this example the objective was to eat healthier snacks), but by taking time to make sure there is some way of measuring whether the objective has been achieved (e.g., through caloric intake or, in the case of the example above, weight loss). By making a supposedly healthy food choice based on a gut feeling or hunch (perhaps a local grocery store had placed almonds on prominent display!), this client neglected to identify a clear measure of the healthfulness of that snack – and may have sabotaged her weight loss goal in the process.

In a broader sense, the lack of clearly *operationalized* objectives for many decisions relating to food and agriculture means that individuals and policy makers may end up

basing choices on incomplete or inappropriate information at best, or – at worst – on a hunch. For instance, efforts to establish and promote an alternative food system (or to defend modern industrial agricultural practices) can – in part – be characterized as a series of claims and counterclaims in the media, on the web, and in academia. Proponents of organic agriculture point to issues such as potential improvements in air and water quality, reduced pesticide residue on fruits and vegetables, or increases in on-farm biodiversity as reasons to support this form of food production (Bengtsson, Ahnstrom, & Weibull, 2005; Hole et al., 2005; Hozyash, n.d.; Organic Consumers Association, n.d.; Sierra Club Sustainable Consumption Committee, n.d.). On the other hand, skeptics have questioned the ability of organic agriculture to meet global food demands, or have challenged the veracity of claims that organic foods are better than industrially-produced foods in terms of pesticide residue or the presence of hormones (Avery, 2006). Similarly, as local food supporters have identified benefits in terms of increased economic opportunities, fresher foods, and reductions in transport costs, others have suggested that an overemphasis on local may exacerbate regional inequalities and insularity, or ignore the climate costs of food storage (Hinrichs, 2003; Mariola, 2008; Weber & Matthews, 2008). Even proponents of vegetarianism have faced significant challenges to claims of the environmental benefits of a meat-free diet (Davis, 2003; Morris & Kirwan, 2006).

These examples point not only to the importance of identifying all of the objectives that we wish to achieve with our food choices (broadly speaking) – in other words to avoid an overly narrow focus on one or two objectives at the expense of others, but also to the

necessity of operationalizing these objectives. Without efforts to establish clear and unambiguous measures for the achievement of objectives relating to, for example, environmental health and sustainability, stability and quality of life in rural communities, or the ethical treatment of food animals, the discourse surrounding the food system will continue to be characterized by what seems to be a never-ending series of unverifiable claims and counter-claims – to the detriment of anyone trying to decide what foods to place on their table.

From the perspective of structured decision-making, an *attribute* is a measure that reflects the achievement (or not) of an objective (Keeney, 1996; Keeney & Gregory, 2005). Attributes can occur in universally recognized units like price (in $), volume, or weight, and these directly measure the objective in question (often referred to as natural attributes), e.g., if a food related objective was the reduction of greenhouse gas emissions, then tonnes of carbon dioxide equivalents would be the appropriate measure in that case. Some attributes – sometimes referred to as a constructed attributes – must be created if there are no obvious or appropriate single measures available. Issues such as the well-being of agricultural communities or the environmental impact of our food choices would fall into this category, where multiple measures are often combined to produce a single index, e.g., the ecological footprint calculation (Wackernagel & Rees, 1996), or when numbers are used to reflect different levels of a qualitative or descriptive scale, such as quality of life or the aesthetic value of the landscape. Finally, attributes may be indirect measures of objectives (also known as proxy attributes), and are used when there are no obvious direct measures or indices.

Improvement in the welfare of food and farm animals is an oft-cited food-related objective for many people, organizations, and governments, and proxy measures are most commonly used to reflect the wellbeing of animals. Such measures include incidents of lameness (Hernandez-Mendo, von Keyserlingk, Veira, & Weary, 2007), or the amount of resting or lying behavior (Haley, Rushen, & de Passille, 2000). Similarly, the health of a human population (as it is influenced by food consumption) is often measured as the number or percent of obese or overweight (a proxy attribute).

Yet, despite the many attributes available for food-related decisions, the choice of measure can still be a very challenging decision, and can also reveal a paucity of acceptable measures for very important decision objectives. Indeed, the lack of universally accepted or easily understood measures for some objectives means that more often than not they are overlooked or are impossible – in any practical way – to incorporate into the everyday decision-making process, i.e., easy to understand measures like cost often trump measures of animal welfare or community wellbeing. Unfortunately, for the more complex attributes that are typically associated with modern food production, e.g., social or ethical costs, environmental sustainability or community economic development, the question still remains as to whether these attributes have been sufficiently developed to be useful in even the simplest decision context (Bohringer & Jochem, 2007; Kim, Goldsmith, & Thomas, 2010; Lobao & Stofferahn, 2008). Ultimately, if an objective is of fundamental importance in a particular decision context, then care and effort should be taken to find a suitable measure for it – even if

that means constructing one anew, or finding an appropriate proxy measure for the time being.

3.4 Getting feedback: Make the consequences of food choices more apparent

Even when suitable attributes have been identified or constructed, making the consequences of our food choices more apparent, i.e., through a clear link between objectives, attributes, and measures, can be a difficult task in and of itself. With few exceptions, everyday decisions about food tend not to involve a lot of information about potential implications and outcomes. Similarly, and as has already been discussed, when information is provided it may not account for biases and shortcomings in the interpretation of that information. Compounding these difficulties is the fact that the positive and negative outcomes of our food choices are the result of cumulative effects that may not manifest until well into the future (if at all), what Ratner et al (2008:385) call the 'neglected consequences of distributed choices'. Weight loss can take months or years, cardiovascular disease may not develop until much later in life, and the loss of biodiversity or degradation of ecosystems is a slow process that often extends beyond the lifespan of any one individual. While recent efforts at posting calorie counts in restaurants and sustainability labels on menus have been lauded as an important step in a public education campaign linking food consumption habits and their manifold consequences (Pear, 2010), research from a variety of perspectives suggests that simply providing information, e.g., on a label or posted alongside a menu offering, can be a rather ineffective means of incorporating consequences and measures into our choices (Borgmeier & Westenhoefer, 2009; Downs et al., 2009; Harnack et al., 2008; Just & Payne, 2009).

One way of addressing this educational and informational deficit is to tailor information to be as specific – and immediate – as possible for the individual. Providing feedback has been identified as an important way to overcome this loss of meaning, to make distant outcomes more salient, and to enhance learning (Thaler & Sunstein, 2008). For example, while posted calorie counts – or the calorie counts on a label – may be difficult for individuals to translate into specific implications for their own health needs (Jay et al., 2009), providing *personalized* calorie counts and nutritional feedback to individuals has proven to be a rather effective educational tool. Studies have reported greater achievements in weight loss, a reduction in fat intake, and an increase in the consumption of fruits and vegetables for individuals receiving personalized education and feedback about their food and caloric intake (Bowen, Tomoyasu, Anderson, Carney, & Kristal, 1992; Brug, Oenema, & Campbell, 2003; Saperstein, Atkinson, & Gold, 2007).

The recent proliferation of web-based weight-loss programs and peer support networks, as well as dietary applications for mobile phones, has meant that a much larger audience can benefit from personalized feedback (Saperstein et al., 2007). Similarly, there are a number of technologies that provide immediate and personalized feedback with respect to home energy use, or the energy use of major appliances in the home, and these have shown some success in reducing household energy use (Abrahamse, Steg, Vlek, & Rothengatter, 2007; Fischer, 2008; McCalley & Midden, 2002). In addition, providing personalized feedback on recycling behaviors can lead to increased

participation rates in a community recycling program as well as total amount of material recycled (Schultz, 1999).

Unfortunately, there are many fewer options to provide specific feedback on the environmental outcomes of individual food choices, be they contributions to climate change, habitat loss, or air and water pollution. While there are existing models that translate individual food choices into land and resource requirements (Gerbens-Leenes & Nonhebel, 2002; Peters et al., 2007; Reijnders & Soret, 2003; White, 2000), this work tends to be geared towards an academic audience, and could benefit from an interface that allows individuals to monitor how their food choices translates into a variety of environmental outcomes. On the other hand, there are websites which allow you to calculate an environmental 'footprint (amount of land required to support an individual's 'lifestyle')[4], but they are set at a much coarser scale than would be appropriate for calculating the 'footprint' of individual food choices. And, unlike the fairly straightforward calculations for the calories or fat grams in a serving of food (or the kilowatt hours used by individual homeowners), it has proven a difficult and time consuming task to provide information on the energy or carbon profile of specific individual food choices (Kim & Neff, 2009; Specter, 2008), although some countries are beginning to put such measures into practice (Rosenthal, 2009).

A related concept that warrants inclusion in a discussion about information feedback and processing, as well as how to effectively convey the consequences of a particular

[4] http://myfootprint.org/ or http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/

choice, is *evaluability* (Hsee, 1996). Specifically, the work on evaluability shows that when evaluating an option in isolation, a decision-maker will be influenced more by easy-to-evaluate attributes than attributes that are hard to evaluate (even if the hard to evaluate attribute is – ultimately – more important for the decision context) (Hsee, 1998). In an elegant experiment, Hsee offered students the choice between an under-filled ice-cream cup (containing 8 oz of ice cream in a 10 oz cup) and an overfilled ice-cream cup (containing 7 oz of ice cream in a 5 oz cup). When evaluated separately, students were willing to pay more for the overfilled ice-cream cup; whereas when the two sizes of ice cream were evaluated side-by-side, students were – as would be expected – willing to pay more for the 8 oz of ice cream in the 10 oz cup. What this simple experiment has illustrated is that, in the absence of a frame of reference, students had no idea how good or how bad 7 (or 8) ounces of ice-cream was, and instead cued in on the 'fullness' of the ice-cream serving relative to the cup (characterized as a quick, intuitive and affect-based reaction, and not a careful deliberation of the absolute volume of ice-cream), even though 7 ounces was ultimately a poorer choice than the 8 ounces of ice-cream.

The application of the evaluability hypothesis to the design of food labels has been explored experimentally (Visschers & Siegrist, 2009). In a series of studies, these authors illustrated how the provision of reference information for common food products (as opposed to looking at their attributes, i.e., the numeric representation of a food's nutritional value, in isolation) helped to bring perceptions of the healthiness of these products more in line with their actual nutritional merit. Similarly, Jay et al. (2009) and

Borgmeier and Westenhoefer (2009) utilized color-coding and symbols (e.g., the familiar red, green and yellow traffic light format) to improve the comprehension of nutrition information on packaging, although the comprehension of nutrition labels by individuals with limited literacy was not improved (Jay et al., 2009).

In sum, the provision of information – without attending to some of the limitations in terms of human perception and application of that information – is not an effective means of helping individuals to better match decision objectives with the consequences of their choices. Work from psychology, behavioral decision research, and behavioral economics suggests two promising approaches to overcoming this information deficit: (i) providing information in the form of immediate and personalized feedback, i.e., countering the difficulty we may have with reconciling immediate and salient 'wants' with longer-term but beneficial outcomes that may be difficult to detect without such help, and (ii) providing reference and contextual details such that inappropriate salient, familiar, or affective cues are not attended to at the expense of more important information. Issues relating to other cognitive constraints and time limitations will be addressed in the final section of this paper.

3.5 Context matters: Tailor decision support to the scale at which decisions are made

Throughout this chapter, I have argued that food decisions are often not based on preexisting and well-formed preferences. These supposedly familiar and everyday

choices are instead guided by incidental external cues and/or heuristic shortcuts operating at the time of the decision, and we are often unaware of these influences.

But, the question remains: how can we account for these predictable shortcuts and biases in our decision-making? How can we ensure that the decisions we make with respect to food are in keeping with our values, goals and objectives? How can we tailor our food choices such that they provide benefits (particularly over the longer term) for us as individuals and for society at large, while still safeguarding personal autonomy? As noted in Secion 3.1, two successful approaches are to (i) structure the decision-making process, or (ii) structure the decision-making environment (behavioral interventions or 'nudges'). Both of these approaches build on the four principles just discussed. A brief description of these approaches will occupy the remainder of this chapter, with an eye to highlighting the circumstances under which these different forms of decision structuring can be applied.

MSU's food procurement and provisioning system is an ideal context for the application of a structured decision-making process; various stakeholders could easily be gathered together for a discussion of what is important to them in making their food choices. Students, dining hall staff, chefs, kitchen staff, and food service managers could come together for a thorough discussion of all of the objectives, goals, and values that are a part of their food decision-making (both in terms of individual food choices within the dining hall, as well as in procuring food to serve in those dining halls). As has been described previously, the next logical step would be to then identify the attributes or

measures that can represent these different objectives and allow decision makers to assess the performance of the various decision options in achieving them. Participants would then be asked to list all of the various options that are available to MSU in terms of procuring its food supply, e.g., going with a large multinational food service company, independent procurement from producers, choosing local or organic food producers, or even eschewing meat entirely. Finally, because in most decision contexts there is never a single alternative that meets all objectives, the structured decision-making process explicitly addresses the tradeoffs that must be made among the various decision objectives, i.e., giving up something in terms of one objective in order to gain something in terms of another (Gregory, 2002; Keeney, 1996)[5].

Ultimately, in this structured technique, it is the *process* that is important; following the steps described above breaks difficult decisions down into manageable parts and allows participants to avoid some common pitfalls of decision-making, i.e., focusing too narrowly on available options or attributes, or the avoidance of tradeoffs through the use of potentially biasing shortcuts.

However, decision structuring may not always be appropriate for the many small decisions we make daily about food. Simply in terms of logistics, it would be difficult to provide all of the necessary information and decision support – on a label or a display of some sort – to facilitate a structured choice between, for example, specific items in a

[5] See Hammond, Keeney and Raiffa (1999) or Gregory (2002) for a more thorough discussion of the deliberative and iterative steps involved in identifying decision alternatives and addressing tradeoffs.

conventional grocery store. Likewise, time is often a significant limiting factor. However, this is not to say that such steps can never be used to aid individual food decision-making. Instead – as the example above illustrates – the principles of structured decision making can be successfully applied in settings where individuals can participate in large-scale decisions – and which occur over a much longer time scale – about what foods to purchase and serve, e.g., meal planning in large institutions like universities, hospitals, and corporate campuses, or even the foods to display on the shelves of a grocery store or food cooperative. Using a structured decision-making approach to assist communities in matters of food production and procurement is another example of such an application (Gregory & Gregory, 2010).

Beyond actively structuring the decision-making process, there are a host of options more appropriate for the everyday food decisions of individuals, and these fall under the general category of structuring the decision-making *environment* or 'choice architecture' (Thaler & Sunstein, 2008). Some common and effective examples include (i) the use of defaults, and (ii) commitment devices; the provision of detailed individualized feedback also fits into this category, but has been extensively discussed in Section 3.4.

A 'default' is the choice one ends up with in the absence of an active selection of some other option (Brown & Krishna, 2004); certainly most of us have encountered default settings when – for example – setting up a computer or an online account. Defaults as a type of behavioral intervention have been used successfully in a variety of pro-social and pro-environmental of contexts, including (i) motivating healthier food choices in a

fast food restaurant (Downs et al., 2009), (ii) facilitating the selection of 'green energy' sources for home energy provision (Pichert & Katsikopoulos, 2008), (iii) encouraging organ donation (Johnson & Goldstein, 2003), and (iv) increasing employee savings and enrollment into employer-sponsored retirement programs (Madrian & Shea, 2001; Thaler & Benartzi, 2004). These default interventions are thought to work because they: (i) provide a low-effort option (acknowledging that decisions often require effortful trade-offs)(Kunreuther et al., 2002), (ii) capitalize on the preference for temporally and spatially proximate options (Bazerman, Tenbrunsel, & Wade-Benzoni, 1998; Lynch & Zauberman, 2006; O'Donoghue & Rabin, 1999), or (iii) account for the reluctance of individuals to give up the status quo option (capitalizing on the endowment effect and an individual's aversion to loss)(Kahneman et al., 1991; Tversky & Kahneman, 1991). A default intervention is a major part of this dissertation research, and thus this topic is dealt with in further detail in Chapter 4.

Similar to defaults, commitment devices present another promising option; these have been used most commonly to encourage savings and charitable giving (Milkman et al., 2008a; Thaler & Sunstein, 2003). In these situations, the individual pre-commits to, for example, increasing the proportion of their paycheck going to savings with *future* pay raises (coined the 'Save More Tomorrow' plan) (Thaler & Benartzi, 2004). Such a pre-commitment strategy works because it capitalizes on the tendency of people to put off self-control restrictions, on loss aversion (linking increases in savings with pay raises means that paychecks never decrease), and behavioral inertia (once enrolled in 'Save More Tomorrow', drop-out rates are low) (Thaler & Sunstein, 2008). The popularity of

online ‘resolution’ websites, where people publically pledge to fulfill a resolution – and pre-commit to paying a penalty if they don’t, is testament to the power of ‘commitment’ in making the positive outcomes of behaviors more salient as well as increasing the (social and monetary) costs of not fulfilling the promise (Rosenbloom, 2011).

While these techniques have not yet been applied to encourage more environmentally friendly eating habits, it is easy to see how it might be applied. For example, in on-line grocery shopping or weekly food delivery venues people could have the opportunity to pre-commit to certain meals in future deliveries (based on whether they were interested in addressing the carbon output of their diet, reducing their food footprint, etc.). Indeed, Milkman et al (2008b) have shown that the percentage of ‘should’ (healthy) foods chosen in a popular on-line grocery venue was positively correlated with how much in advance these foods had been ordered; in other words, last-minute grocery shopping lead to poorer – and in some cases more costly – food choices.

In sum, there are a host of decision support approaches and behavioral interventions[6] available to improve the quality of decision-making and account for the biases and unhelpful shortcuts that may prevent us from achieving our goals and objectives – food-related or otherwise. Choosing an appropriate approach will in part be dictated by

[6] While there are other interventions that have been shown to motivate pro-environmental behavior, e.g., through the use of descriptive and injunctive norms or modeling desired behaviors, I chose to focus on interventions that had a direct link to the decision biases and shortcuts described throughout this chapter, and/or which had an obvious application in promoting better food choices.

whether we are dealing with the small, everyday decisions of individuals, or a larger, but more infrequent, decision with multiple stakeholders.

4. Conclusions

The principles discussed in this chapter apply both to decisions made by an individual consumer on behalf of themselves and those closest to them (e.g., family members), as well as those individuals or groups that have a responsibility to procure and provide food on a much larger scale (e.g., grocery stores, restaurants, cafeterias, hospitals, etc.). Food decisions can be difficult for anyone, not only because of the multiple concerns and objectives that must be addressed, but also because of the common shortcuts and biases that may come into play when making a choice, and the often undetected influence of context and emotional response (which may ultimately hinder us from effectively addressing our concerns and objectives). Informational and educational campaigns are commonly used to help consumers make 'better' decisions about food, e.g., encouraging healthier, more environmentally friendly, or more humane choices through the use of labels, posted calorie counts, and web-based campaigns, but their effectiveness has been challenged of late. However, there are a number of principles derived from behavioral decision research and the constructive nature of preferences that can be applied to help increase the effectiveness of information provision and educational efforts. These include: (i) obtaining a clear and complete sense of what matters in food decisions, (ii) identifying appropriate measures for these objectives, (iii) providing effective feedback, and (iv) structuring the decision-making process – in the case of larger and more complex decisions with multiple stakeholders,

or – in the case of smaller and more frequent decision – using behavioral interventions like commitment devices and defaults to make it easier for individuals to ‘do the right thing’.

These principles also provide the basis of the remainder of this dissertation. Chapter 3 will discuss a structured elicitation of food-related objectives from freshmen at Michigan State University, with an eye to (i) fully characterizing all of the objectives that are important to students when making their food choices (and how issues of environmental health and sustainability factor in to these choices – if at all), and (ii) informing future behavioral interventions to better match food choice with these stated objectives. Chapter 4, building on what has been discussed in Chapters 2 and 3, will describe the experimental test of a default intervention design to facilitate a more ‘environmentally friendly’ food choices among students who frequent the campus residential dining facilities.

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CHAPTER 3

Student objectives relating to food choice: An exploratory focus group and interview-based study

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Abstract

The campus Environmental Stewardship program at Michigan State University (MSU) is charged with exploring all aspects of the university's approach to sustainability, with the ultimate goal of reducing the university's environmental footprint. The university's food system in particular is well positioned to make contributions towards the achievement of a broad range of environmental sustainability outcomes. As a first step towards implementing these sustainability outcomes, focus group and interview sessions were used to gather Michigan State University students' objectives relating to food choice, with an eye to determining if pro-environmental objectives factor into these choices. A structured decision-making framework provided guidance in the identification and organization of students' food-related objectives into a means-ends objectives network. Ultimately, the means-end objectives networks which emerged out of these discussions provided a visual representation of the food-related objectives students found important (and the connections between them), and allowed for a ready comparison among the different groups of participants in this study (both randomly recruited students, as well as students purposively recruited out of campus environmental and alternative agriculture programs). Objectives relating to taste, health, enjoying the dining experience, and safety were extensively discussed, and this is in keeping with what has been found in other studies. Connections between food and environmental sustainability, e.g., through food overproduction and waste, dining hall practices (dishwashing and non-recyclable items), organic food, local food, modern food production practices, and the implications of raising animals for food, were also discussed. It was important to gain a thorough understanding of how students see

environmental issues playing into their food choices on campus (if at all), both to inform future campus environmental sustainability efforts in residential dining halls, as well as to inform research conducted for the last chapter of this dissertation. Finally, although many students made connections between their personal food choices and a variety of negative environmental outcomes, these discussions also revealed the need for an information campaign that would help students to further identify and clarify these connections.

1. Introduction

There is widespread interest in addressing energy and resource use at a variety of levels, e.g., individual, community, government, corporation and institution. Concerns about global warming, the growing scarcity of some resources – including fresh water, as well as the degradation of ecosystems and the services they provide – have led the charge in motivating these energy and resource conservation efforts. Actions as simple as recycling or turning down home thermostats to as complex as the complete redesign of buildings and cities are all examples of such efforts.

The promotion of organic and local food production, as well as campaigns to move away from highly processed or meat-centered diets, also have as part of their goals a reduction in negative environmental outcomes, both direct, e.g., water and air pollution, and indirect, e.g., the energy-inefficient and resource-intensive nature of much of our food production practices (particularly for developed countries). Educational institutions – and in particular post-secondary institutions – are particularly well suited to address resource use and environmental sustainability goals, both in terms of their size, purchasing power, and potential environmental footprint, as well as in terms of educating and empowering the next generations of innovative thinkers to tackle these vexing problems. Michigan State University's own efforts at identifying and achieving environmental sustainability goals across a broad range of departments and services provide the context for the research presented in this Chapter.

The campus Environmental Stewardship program at Michigan State University (MSU) has put in place a variety of ambitious goals relating to environmental sustainability. These include shrinking the campus' environmental footprint (reducing energy and resource use), reducing waste outputs (via recycling and reuse of materials), and lessening greenhouse gas emissions (through improvements in the way energy is provided on campus, increases in efficiency, and the use of carbon offsets). Overall, the Environmental Stewardship program is charged with exploring systemic, innovative, and transformative changes to all facets of the university's approach to environmental stewardship; and the university's food system is one area where a broad range of health and environmental sustainability outcomes can be achieved. As a first step in the realization of environmental sustainability goals in the area of food provisioning and procurement, this study sought to document student objectives relating to food choice on campus, with a particular focus on identifying and elucidating any environmentally related food objectives that these students may have.

There were three reasons for gathering data on student's food and environment-related objectives. First, it is important to gain a thorough understanding of how students see environmental issues playing into their food choices on campus (if at all), and to compare their objectives to those of MSU's Residential and Hospitality Services (RHS) – the people responsible for food procurement and provisioning on campus. Differences in the objectives of these two groups may indicate areas where information provision and a dialogue between them may be necessary. Second, any effort directed at changing how food is provided on campus – or the kinds of foods served – should be

informed by an understanding of what students want to achieve with their own food choices. Third, since there are two undergraduate programs on campus (RISE – Residential Initiative on the Study of the Environment, and SAFS – Sustainable Agriculture and Food System Specialization[7]) that explicitly address the connection between food and environmental issues (among other issues), a secondary focus of this research was to determine if students enrolled in these programs had different food-related objectives than students recruited at random from the freshmen population (reflective of their exposure to – or a personal interest in – topics related to food, agriculture or the environment in the RISE program or SAFS specialization).

A structured decision-making framework (Gregory, 2000; Hammond et al., 1999) – and in particular the initial phases of this framework: the construction of a means-ends objectives network – provided guidance for this research. Spending time developing and clarifying a comprehensive set of objectives has been identified as one of the most important steps in any decision-making process (Gregory & Keeney, 2002; Keeney, 1988, 1996). The goal of an objectives elicitation process is to create as complete a list of objectives as possible of what an individual or group wishes to achieve in a particular decision context (adapted from Hammond et al., 1999; Keeney, 1996). These objectives are defined as both what is important for an individual to achieve, i.e., what matters, in a particular decision context, as well as a reflection of the personal values that may also play a role in these decisions (Gregory et al., 2001; Hammond et al., 1999).

[7] These programs, at the time this study was conducted, were the only environment- and food-related campus groups that had freshmen members.

Objectives are further differentiated according to whether they are 'means objectives' or 'ends objectives' (also referred to as fundamental objectives). Means objectives are categorized as 'means' because they help to achieve other, more fundamental, objectives. Ends objectives represent more fundamental values or goals that are, in and of themselves, important (Hammond et al., 1999; Keeney & McDaniels, 1999). For example, in a study to support the implementation of a multi-stakeholder management plan in Tillamook Bay, Oregon, one ends objective was to "promote the biological health of Tillamook Bay." In other words, when asked, study participants felt that this objective was important in and of itself. The means objectives that directly related to the biological health of Tillamook Bay involved such issues as "limiting cattle access to streams," "restoring tidal wetlands and sloughs," and "improving salmon rearing habitat" (Gregory, 2000). These objectives were categorized as 'means' objectives because their importance was derived from the fact that they helped to achieve another, more fundamental objective.

Ultimately, relying exclusively on means objectives can limit potential solutions to decision problems. In the research reported here, an ends objective as identified by students was to "eat foods with positive environmental outcomes," and this makes available many more meal options for students, e.g., avoiding processed foods, eating less meat, or minimizing food waste, as opposed to adhering strictly to the means objective "eat more organic foods" when deciding what to eat (at least in terms of choosing foods that address environmental concerns). In addition, querying the

reasoning behind the desire to eat more organic foods (or local, or vegetarian) challenges the decision-maker to think about why such choices are made, and – ultimately – if there are alternative means of addressing those needs, as opposed to simply going with the obvious or familiar. For the specific purposes of this chapter, however, the construction of a means-end network will provide a visual representation of the food-related objectives students find important, and why. Thus, the means-end network will function as a kind of mental model[8] of these objectives (and the relationships between them), and allow for a ready comparison among the different types of participants (Morgan, Fischhoff, Bostrom, & Atman, 2002).

The questions that will be addressed through this exploratory study are:

1. What are the key means and ends objectives that students associate with their food choices in the campus dining halls?
2. In the absence of prompting, will students include such specific environmental issues as: meat consumption, carbon footprint, local/seasonal choices, consuming less, minimal processing of foods, etc., as part of their food-related objectives?
3. Do students with pro-environmental backgrounds and interests have more extensive means-ends objectives networks (reflective of a broader set of criteria for making food choices) than those without such backgrounds or interests?

[8] A diagrammatic representation of how a person thinks about a particular topic; typically elicited via open-ended interviews.

2. Methods

Food-related objectives were gathered from students through focus group discussions and individual interviews. The focus group format was initially chosen because: (i) it offers a more efficient way to gather qualitative data as compared with individual interviews (Morgan, 1997), and (ii) the format provides an opportunity to observe group interactions on a particular topic, as well as the degree of consensus and diversity among participants (Chambers et al., 2007; Morgan, 1997). However, to gain a better sense of the extent to which the group discussion format influenced how individuals characterize and articulate their own food choice and environment-related objectives, individual interviews of students – using the same instrument as in the focus group – were also conducted.

Recruitment

Recruitment letters were mailed to a random sample of 500 MSU freshmen, inviting them to participate in the focus groups and interviews; the purpose of these discussions was described as providing information to MSU Residential and Hospitality Services so that they may better serve students' food needs (with no mention of an environmental agenda). The invitation also indicated how much time would be required of students (approximately 2 hours), and that they would be compensated for their participation ($30). Approximately 75 students responded to the recruitment letters (for a response rate of approximately 15%), and I was able to schedule 45 of those into either focus group or interview slots – with 39 of these scheduled students actually showing up to participate (all 'no-shows' were scheduled to participate in the focus groups). Purposive

sampling was also used to recruit MSU freshmen from an environmental program (i.e., the RISE program: Residential Initiative on the Study of the Environment) and an alternative agriculture specialization (i.e., SAFS, the Sustainable Agriculture and Food Systems Specialization). Students from these two groups comprised the remainder of participants (13).

Focus groups ranged in size from 2 to 9 people[9] and contained a mix of male and female students; all but one interview was with a female student (see Table 1 below). Overall, 61.5% of participants were female, and thus were slightly over-represented in comparison to the gender distribution among all MSU freshmen (approximately 55% Female, 45% Male). Focus group discussions and interviews occurred between December 2009 and January 2010, with a final three interviews completed in April 2010.

Table 1: Size and gender composition of focus groups and interviews.

Focus Group or Interview	Number of Participants	Gender: Females/Males
Randomly recruited:		
Focus group 'RF1'	7	3/4
Focus group 'RF2'	7	4/3
Focus group 'RF3'	9	6/3
Focus group 'RF4'	8	3/5
Focus group 'RF5'	2	1/1
Focus group 'RF6'	2	0/2

[9] Five and seven students respectively were recruited for focus groups 'RF5' and 'RF6', but only two students showed up on both occasions. These small groups were still considered focus groups as each participant responded to and followed up on topics/objectives raised by the other.

Table 1: (con'td)

Interview 'RI7'	1	1/0
Interview 'RI8'	1	1/0
Interview 'RI9'	1	1/0
Interview 'RI10'	1	0/1
Subtotal	39	20/19
Purposively recruited (RISE, SAFS):		
Focus Group 'PF1'	4	3/1
Focus Group 'PF2'	3	3/0
Focus Group 'PF3'	5	4/1
Interview 'PI4'	1	1/0
Subtotal	13	11/2
Total	52	32/20

Focus group and interview protocol

A semi-structured interview protocol, with five open-ended questions and follow-up probes, was used to elicit objectives during focus group discussions and interviews (see Appendix A for the exact wording of questions). Students were provided with a workbook that contained each of the interview questions, as well as dedicated space where they could write down their answers prior to discussing them. Students were thus able to read along with the moderator as each question was introduced.

All sessions began with a thorough discussion of what is important for students when choosing food meals on campus. Students were first asked to describe their favorite meal as well as the specific characteristics that made it their favorite. A second, more general, question posed to students asked them to articulate the characteristics of foods they frequently seek out vs. foods they routinely avoid. The ranking of the food-related

objectives into means and ends objectives was achieved through an iterative process of probing 'why' a particular objective was important. For example, many students described one of their objectives as seeking out fresh fruits and vegetables for their meals. When asked why this was so, their answers typically involved a discussion of the healthful properties of these foods. Thus, eating fresh fruits can be seen as a *means* to the more *fundamental* objective of maximizing the healthiness of a meal. At this point in the interview or focus group, it was stressed to the students that there was no 'right' way to respond to these questions. The ultimate purpose of the session was to document as complete a list of food-related objectives as possible.

The third and fourth question of the session involved the ranking and rating of a variety of food-related characteristics as identified by other students. This list of characteristics was initially compiled from informal discussions with two freshmen research assistants, but was changed at the midpoint of the focus groups/interview sessions to accommodate the new objectives identified by participants. In all, four focus groups (31 students in total) assessed the first version of this list of food characteristics; five focus groups and all interviewees assessed the second version of the list of characteristics (21 students in total).

The food-related characteristics included freshness, taste, and healthy, as well as more environmentally related characteristics as organic, local, and vegetarian. Students were asked to rank these characteristics in descending order of importance for them, as well as rate each characteristic on a 10-point Likert scale, ranging from 1 (not at all important

to me) to 10 (very important to me) (see Appendix A for these questions). The discussion that followed this exercise had students (i) identify their top five characteristics, and (ii) further clarify why these characteristics were important to them as well as how they sought them out in the campus dining halls. Since a number of environmentally related food characteristics were incorporated into this list, many students were prompted to include them into their own 'top five' – even if they had thus far not been mentioned at all.

The last part of the discussion (Question 5) centered around asking students about the extent to which environmental concerns played into their food choices on campus (if at all). If a student indicated that they did not think about the environment when making their food choice, they were asked instead to think about environmental sustainability in more general terms, e.g., define it in their own words and describe some of human activities that harm the environment. More often than not this lead to a discussion of environmental concerns linked to food-related behaviors (sometimes their own, e.g., meat consumption or organic foods, but mostly in a more general sense, e.g., food waste or agricultural practices) they had observed in the dining halls and elsewhere. Again, it was stressed to participants that there were no right or wrong answers to this question.

Procedure

In order to maintain consistency among the different groups and formats, one individual (the author) moderated each focus group and interview. A note-taker was present at

each session, and each session was recorded with a digital voice recorder. Focus group discussions typically took between 1.5 to 2 hours (slightly less for the small groups), and interviews were typically 40 to 50 minutes in length. At the beginning of each session, the purpose of the focus group discussion/interview was explained to participants verbally as well as in writing on the consent form. Once all participants had read and signed the consent form (which included a consent to be recorded)[10], the moderator led the group (or interviewee) through the interview protocol as described previously. At the end of the session, students were thanked, debriefed, and provided with $30 for their participation.

The digital voice recordings for each focus group and interview were transcribed, and – once fully captured in written form – the recordings were erased. To further protect the identity of participants, the name of each student was removed from the transcript and replaced with a pseudonym.

Data analysis

Themes, from now on referred to as objectives, were identified in the transcripts using an inductive method (Bernard & Ryan, 2010); there was no a priori expectation as to what specific objectives students might have with respect to their food choices on campus. The author coded the transcripts by hand, highlighting words used by interview and focus group participants and making notes in the margins of the

[10] This protocol was reviewed and approved by MSU's Institutional Review Board, and the appropriate procedures for acquiring informed consent were followed.

transcripts[11]. A second coder, with experience in conducting focus groups and in the construction of means-ends objectives networks, independently coded three transcripts (two transcripts from the randomly recruited focus groups, and one transcript from the purposively recruited focus groups).

To keep the list of objectives manageable, some objectives were merged during this process, for example, the objective 'fresh' encompassed specific reference to such things as freshly fried, freshly prepared, or foods that had not been sitting out, whereas the objective 'like at home' refers to foods that reminded the student of home or what were typically prepared and served by their parents or grandparents. Any disagreements between these coders in the identification of objectives or in the merging of objectives into more inclusive categories were resolved through discussion. After working through the transcripts in this manner, a comprehensive set of objectives (themes) was identified.

Once a list of student's food-related objectives was identified, transcripts were re-read, this time with an eye to differentiating between means and ends objectives (when these were not discussed outright by the participants). A separate coding table (Bernard &

[11] Some codes were taken directly from the transcripts, e.g., 'fresh', 'convenient' or 'safe', other codes were developed to represent related objectives, e.g., 'skill in preparation' (representing students wanting to avoid 'just add water' foods, or seeking out foods prepared by MSU culinary students), or 'positive dining experience' (representing a desire on the part of students to enjoy the setting where they eat their meals).

Ryan, 2010)[12], with a list of objectives for each focus group and interview, was created and notes were added to indicate whether each of these objective was a means or ends objective (Appendix B). This task was facilitated by the fact that, during the focus groups and interviews, students were specifically questioned as to 'why' a particular objective was important to them; in other words, the interview protocol was specifically structured to differentiate these objectives into means and ends (the 'why' probes discussed earlier). The second coder was consulted during this latter process[13]. An earlier iteration of student's food-related objectives was also shared with key Residential and Hospitality Services (RHS) staff.

More specifically, if a student mentioned an objective because it helped achieve some other – broader – objective, it was identified as a 'means' objective. For example, students often said that they like to eat fresh fruits and vegetables. When asked why it was important for them to eat such foods, students discussed the fact that they were good tasting or healthy. Thus, when coding, the objective '(to eat more) fresh fruits' was often annotated with '*fresh fruits → health*' or '*fresh fruits → taste*' to indicate that health and taste were the ultimate reasons for selecting fresh fruits. In a more complicated example, students often mentioned that they sought out foods that reminded them of home, and when asked why that was important, students discussed issues of being

[12] Although techniques for qualitative data analysis are used here, the intent was not to develop a 'grounded theory' out of the data (in the strictest sense) (Bernard and Ryan 2010). Instead, these techniques were adopted in order to systematically identify and organize students' food-related objectives in a replicable and reliable manner.

[13] The author and the second coder reviewed three transcripts alongside a draft of the coding table. Any disagreements in the differentiation between means and ends objectives were resolved through discussion.

familiar with or comforted by that food. A follow-up probe indicated that familiarity with a food was a signal to a student that the food was likely going to taste good (as opposed to going with unfamiliar foods). Thus, the 'like at home' objective was annotated as follows: '*like at home → familiar → good taste/positive sensory experience*' or '*like at home → familiar → enjoyable dining experience*'. Finally, if an objective was important in and of itself, i.e., a student responded to a 'why' question by reiterating or describing the same objective in a different way, then it was classified as an 'ends' objective. For example, when asked why eating healthy foods was important, students often described feelings of healthfulness, their ability to participate in physical activities, or staying focused in class.

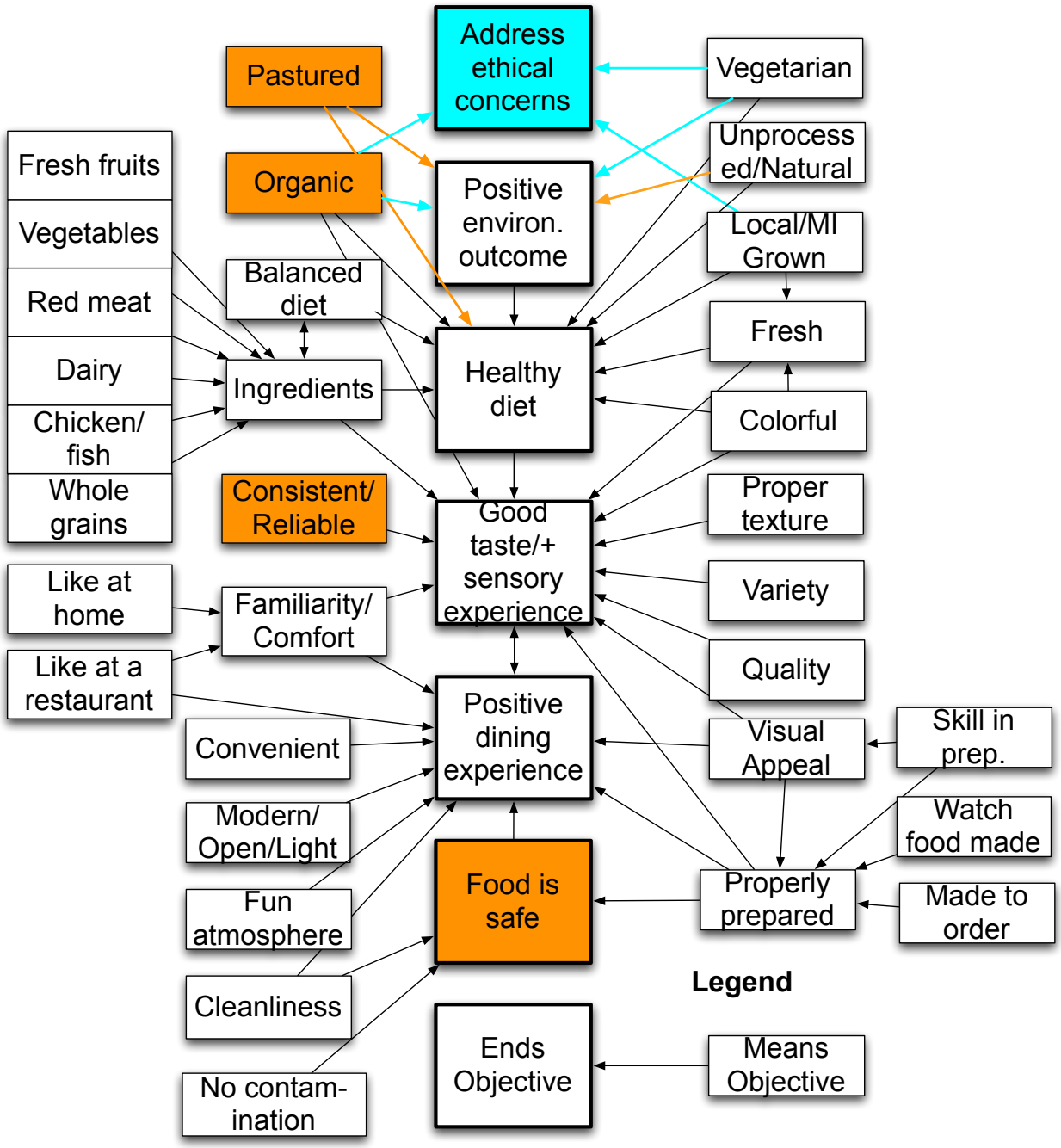
The original intent of the discussions emerging out of Question 5 was to develop in more detail the means-ends objectives that students had with respect to their own food-environment connections. However, many students had a difficult time relating their individual food choice with environmental outcomes, so it was decided to instead code for mention of: i) food choice or food production practices, or specific practices within MSU's dining halls, that students associated with environmental sustainability and the health of the environment, and ii) the unique connections that students make between these practices and environmental outcomes (positive or negative). For example, students often initially identified food waste as an environmental negative. Follow-up prompts aimed to reveal *why* students made this connection and/or to further describe and elaborate on what they thought were the environmental negatives that resulted from these practices.

3. Results

Six ends objectives emerged from discussions with students: (i) address ethical concerns, (ii) ensure positive environmental outcomes, (iii) maximize the consumption of healthy foods (have a healthy diet), (iv) seek out foods that taste good and provide a positive sensory experience, (v), ensure a positive dining experience, and (vi) ensure that food is safe. Unless otherwise specified, the following text refers to Figure 1 (below); ends objectives are arranged randomly within this diagram.

For the ends objective 'address ethical concerns', students discussed their concern for the plight of food animals (and their choice to become a vegetarian), the contributions that local and Michigan-grown food choices have for the local economy (and thus their desire to seek out such foods), the survival of small farms, and the fact that organic production has benefits for farmers' health (in that farmers don't have to expose themselves to pesticides). The means objectives associated with 'ensuring positive environmental outcomes' included adopting a vegetarian diet, choosing organic food, choosing natural and unprocessed food, and seeking out products from pasture-raised animals. Some of these same objectives were also associated with a healthy diet (vegetarian and organic), and food that tastes good (organic).

Figure 1: Means-ends objectives network of student discussants: a comparison of randomly recruited students vs. those who were recruited out of environmental/agriculture programs. The colored boxes and arrows highlight objectives or connections between objectives that were only discussed by either randomly recruited students (orange) or purposively recruited students (light blue)[14].



[14] For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.

Other means to achieving a healthy diet included consuming fresh and colorful fruits and vegetables, following the guidance of the USDA food pyramid (having a balanced diet), and eating local or Michigan-grown foods (connection to freshness and – ultimately – taste). Note that many students spoke of *avoiding* certain foods because of their negative impact on their health, i.e., fatty, oily and fried foods, red meat, meats in general, and excess carbohydrates and sugary foods (Table 2).

Table 2: Foods that student discussants typically avoided in the dining halls

Food Type	*Reason*
Fatty/oily/greasy, Fried	Health, taste, texture
Sugary, Carbohydrates	Health, medical
Red Meat	Taste, health, questionable quality
Meat	Health, ethical, environmental, religious
Large portions	Health, environmental
Fish/Seafood, Eggs	Taste, questionable quality
Not fresh, Not properly prepared, Contaminated/unclean	Taste, texture, safety

Finding foods that taste good and provide a positive sensory experience was achieved by seeking out fresh foods, foods with proper color and texture, familiar foods (such as what would be served at their home or at a favorite restaurant) and quality foods (meaning expensive cuts, premium brands, or just a 'quality' taste). Students also sought out consistently reliable dining hall 'standards', e.g., the salad, sandwich or pasta bars, to ensure that the foods they chose tasted good, in addition to being able to observe if there was skill or care in preparation of these foods. Choosing foods prepared by culinary students in Snyder Philips Hall, or at least being able to direct and watch their food being made, all provided for a positive dining experience. For this latter

'ends' objective, students also sought out dining halls that were clean, bright and reminded them of a restaurant, or which had a 'fun' atmosphere, i.e., televisions and comfortable chairs. The convenient location of dining halls and the convenience of many food offerings, i.e., 'grab and go', also added to a positive dining experience; students disliked waiting too long in lines and walking too far to find a place to eat on campus.

Finally, a number of students sought out assurances that foods were safe, typically out of concern for food-borne illnesses or personal experience with food poisoning. The means of objectives for achieving food safety included seeking out clean dining halls and serving areas, avoiding foods that were obviously contaminated or not prepared properly, e.g., cooked at the proper temperature, gloves worn by servers, or foods not dropped on the floor. Freshness was also connected to food safety in that foods which looked like they had been sitting out for a long time were avoided, and 'made to order' foods allowed the student to watch their food being prepared (to ensure freshness, and that proper procedures were followed) (see also Table 2).

A comparison of randomly recruited students and students from environmental and agriculture programs

The means-ends objectives for these two sources of students were similar, but there were some important differences (see Figure 1). First, while vegetarianism was mentioned by both randomly recruited students (three out of ten focus groups and interviews) and students from environmental and agriculture programs (two out of four

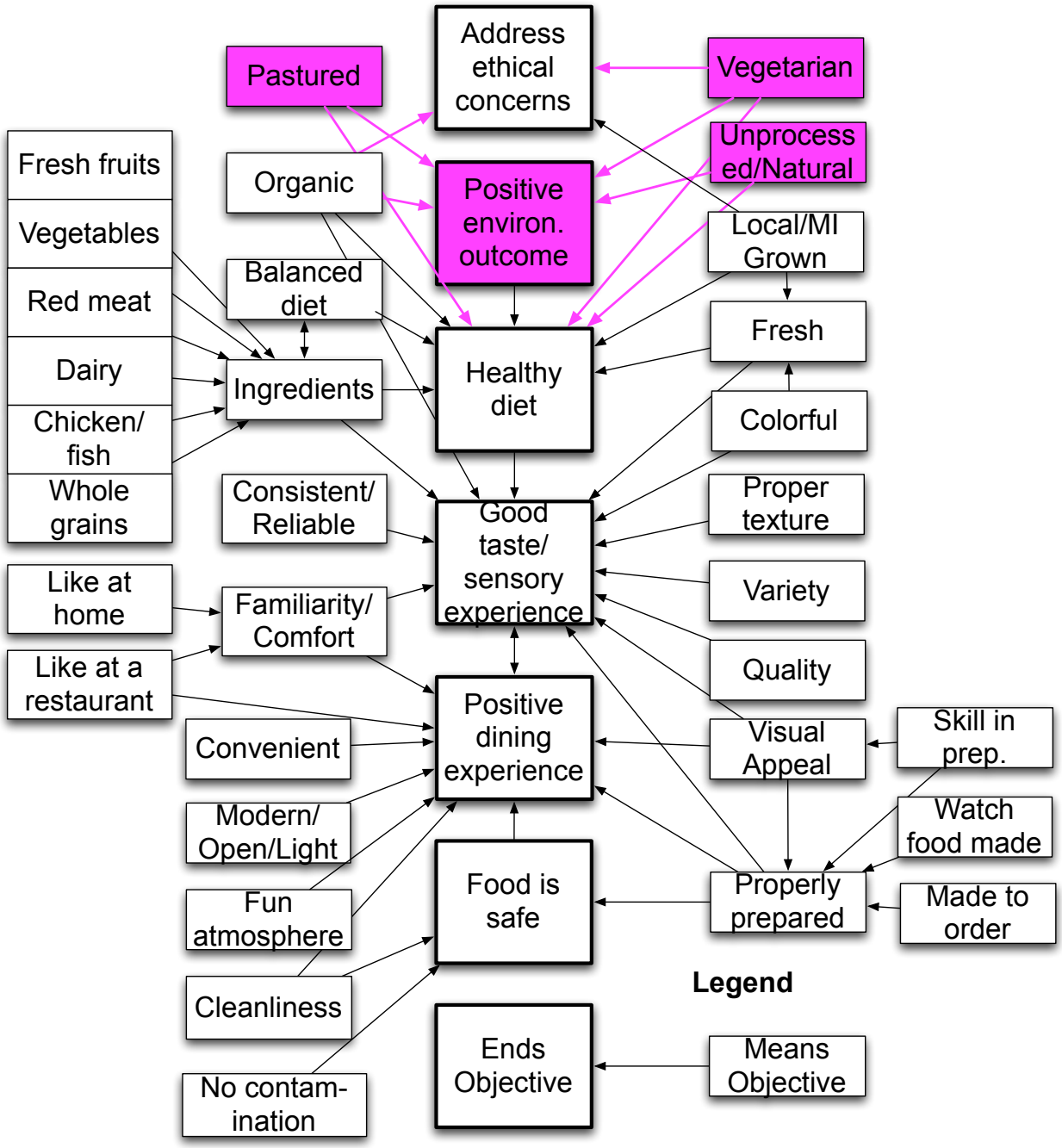
focus groups and interviews), only students from this latter group (hereafter referred to as purposively recruited students) made a consistent connection between meat consumption and negative environmental outcomes (I discuss this further in the next section) or meat consumption and ethical concerns. Vegetarianism was otherwise only discussed in terms of health benefits or the ethics or cruelty associated with eating animals. Seeking out foods that were natural or unprocessed was similarly connected to health objectives among those who mentioned it (both in randomly and purposively recruited focus groups and interviews); only one student (in focus group 'RF6'), made a connection to between processed foods and negative environmental outcomes.

Only students in the randomly recruited focus groups and interviews initially mentioned a desire to consume organic foods (mentioned in four of ten of these focus groups and interviews), but again only in the context of health and taste (with organic foods perceived as healthier and better tasting than conventionally produced foods). Students in the purposively recruited groups also discussed organic food (in three out of four of these focus groups and interviews) but, interestingly, only *after* encountering that objective in the ranking and rating exercise (i.e., Questions 3 and 4 of the semi-structured interview protocol). However, in these subsequent discussions, organic foods were connected with positive environmental and ethical outcomes, in addition to taste and health objectives. A connection between local or Michigan-grown foods and positive ethical outcomes was also only ever noted by purposively recruited students. Only one student (in focus group 'RF6') mentioned seeking out pastured animal products and a connection to positive environmental and health outcomes.

Focus groups vs. interviews

Student interviews, regardless of whether they were with randomly recruited students or not, did not result in any discussion of positive environmental outcomes as an ends objective, nor was there any mention of seeking out pastured animal products, vegetarian options, or unprocessed/natural foods (see Figure 2 below). Organic foods were mentioned, but only to meet health and taste (ends) objectives. However, one purposively recruited student (interview 'PI4') made a connection between choosing local or Michigan-grown foods and addressing her ethical concerns. Otherwise, the means-ends objectives networks generated by interview and focus group discussions were similar.

Figure 2: Means-ends objectives network of student discussants: a comparison of focus groups and interviews. The pink-colored boxes and arrows highlight objectives or connections between objectives that were only discussed by students in focus groups.



Ranking and rating exercise

The ranking and rating exercise (Question 3 of the focus group/interview guide) reflected much of what was discussed among the student participants. In both versions of this exercise, taste, freshness, and healthy were the most important food-related characteristics for students in the focus groups and interviews (as reflected in the rankings), whereas organic, vegetarian, animal welfare, fair trade, Michigan grown, and locally grown were categorized as the least important (see Tables 3 and 4 below). 'Variety' and 'quality', appearing in the second version of the exercise were also highly ranked by students, whereas characteristics like convenience, consistent, appearance, natural, safety, and familiarity were ranked in the middle. The characteristic 'low fat' dropped in importance between the two versions of the exercise; this characteristic was ranked in the middle when included in version the first version of the list (Table 3), but was ranked near the bottom when included as part of the second (updated) version of the list (Table 4). The ratings that students assigned to these characteristics (ranging from 1 'not at all important to me' to 10 'very important to me') largely echoed these results.

Table 3: Ranking[15] and rating[16] of food characteristics (first version) (n = 31)

Characteristic	Average Ranking	Average Rating
Taste	2.2	9.5
Freshness	2.8	9.2
Healthy	3.0	8.3
Consistent	6.1	7.7
Convenience	6.1	7.3
Low Fat	5.9	6.5
Appearance	5.6	7.5
Organic	8.3	4.9
Vegetarian	9.9	3.5
Animal Welfare	10.0	4.3
Fair Trade	10.2	4.6
Michigan Grown	10.2	3.6
Local	10.6	3.3

Table 4: Ranking and rating of food characteristics (second version, updated based on what was said in focus groups to date) (n = 21)

Characteristic	Average Ranking	Average Rating
Taste	4.0	9.2
Freshness	4.4	8.6
Healthy	4.8	8.3
Variety	5.3	8.0
Quality	5.4	8.6
Natural	7.8	6.7
Safety	8.7	7.6
Consistent	8.9	6.0
Convenience	9.2	6.2
Familiar	9.3	5.6
Organic	9.5	5.7
Low Fat	9.5	5.5
Vegetarian	10.0	4.3
Michigan Grown	10.9	4.8
Local	11.1	4.5

[15] Descending order of preference.

[16] Rated on a 10-point scale, with 1 = not at all important, and 10 = very important.

The food – environmental sustainability connection

In every randomly recruited focus group and interview, there was at least one student who stated that they did not think about the health of the environment or environmental sustainability when making their food choices; this was mentioned in only half of the purposively recruited focus group/interviews. That said, a number of students also indicated that they would like to know more about the connection between their food choices and environmental sustainability.

Once a discussion of the food-environmental sustainability connection began, there were a number of themes that emerged in all focus groups and interviews, these were: i) food waste, ii) dining hall practices (dishwashing and non-recyclable items), iii) organic food, iv) local food, v) modern food production, and vi) raising animals for food (see Figure 3 a - f below). While there was considerable overlap between what was discussed by randomly and purposively recruited students, there were a number of differences in what was said about this topic in these two groups.

In terms of food waste (Figure 3a), many students blamed the common practice of taking too much food in the dining halls, as well as the general overproduction of food by producers (this latter point was made in four of the ten randomly recruited focus groups). The environmental negatives of wasting food were commonly identified as increasing the demand for landfill space and taking away from others who may not have sufficient food. While some students saw a positive environmental connection between food waste, compost and soil fertility, discussions in two of the randomly recruited focus

groups made a connection between food overproduction and soil exhaustion. Finally, one student, in purposively recruited focus group 'PF1', drew a connection between food decomposing in landfills, methane gas production, and climate change; noting also that methane can be – and is – used to produce electricity.

Environmentally related criticisms of dining hall practices pointed to the contribution of non-recyclables (or recyclables that end up in the trash) to increasing demand for landfill space, garbage transport, and the impact that our trash will have on future generations (Figure 3b). All of the purposively recruited groups/interviews made specific mention of the energy and resources required to manufacture Styrofoam and paper products, and commented that it was a waste that these items were ending up in a landfill. For many students, excessive plate, tray and glass usage in the dining halls were connected to wasteful energy and water use via the – what seem to be – continually running dishwashers.

Figure 3: Students' connections between food choice, food production, and the health of the environment. Heavily outlined boxes indicate the food-related practices initially mentioned by students. The remaining boxes, and the arrows that connect them, represent the connections between these practices and environmental outcomes (positive or negative), as described by the students. Light blue boxes highlight topics raised only by students recruited from the environmental/agriculture programs, orange boxes highlight topics raised only by randomly recruited students.

Figure 3a: Food overproduction and waste

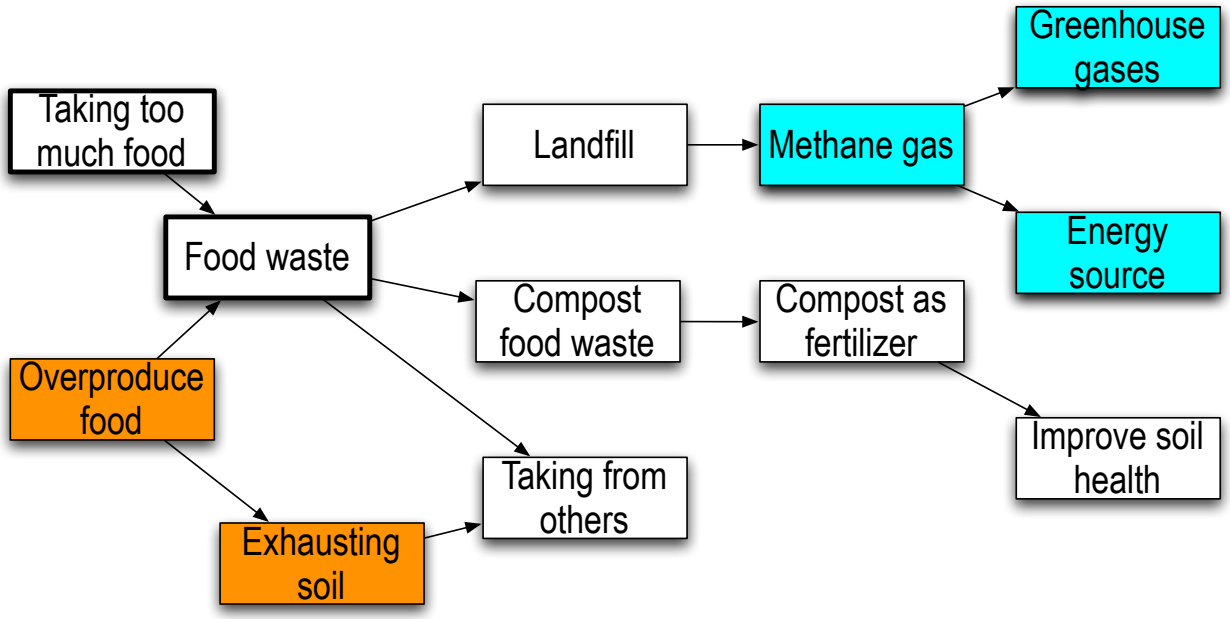


Figure 3b: Dining hall practices

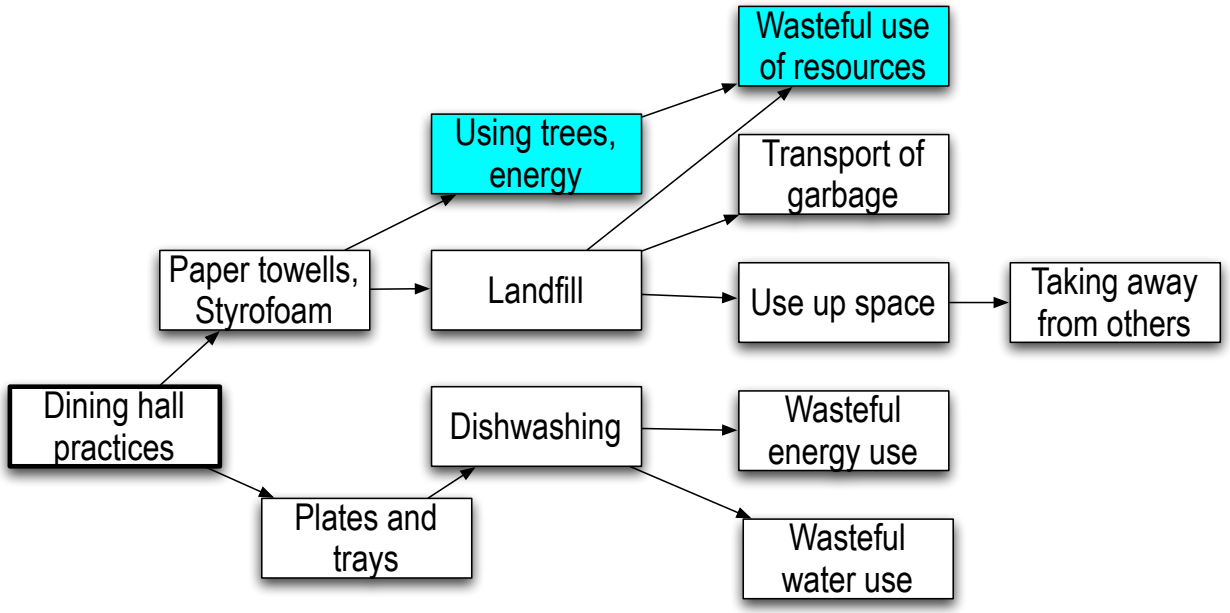


Figure 3c: Local food production

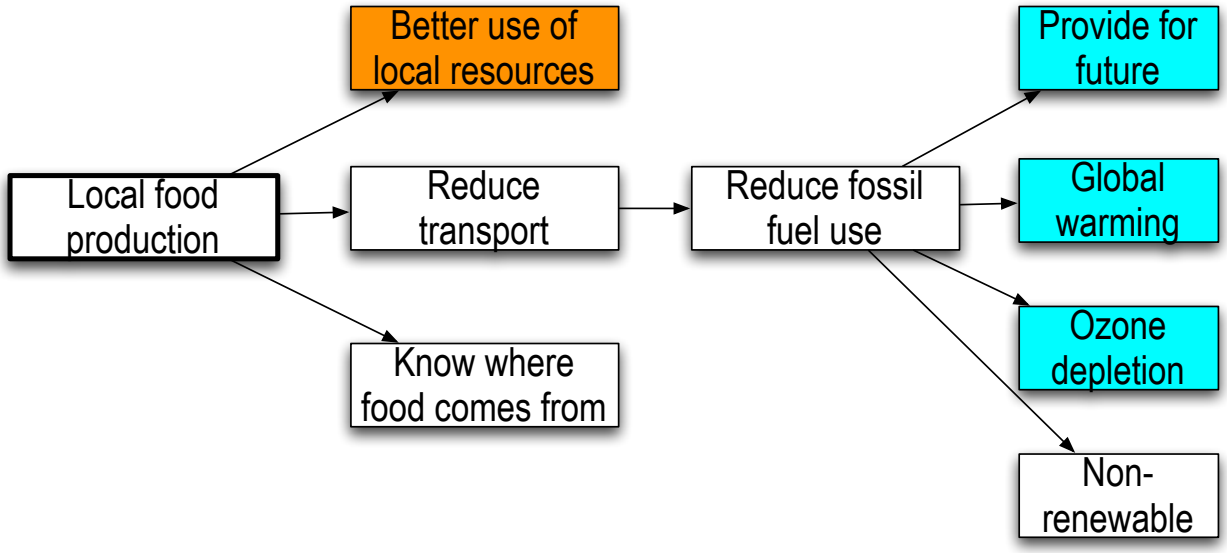


Figure 3d: Organic food production

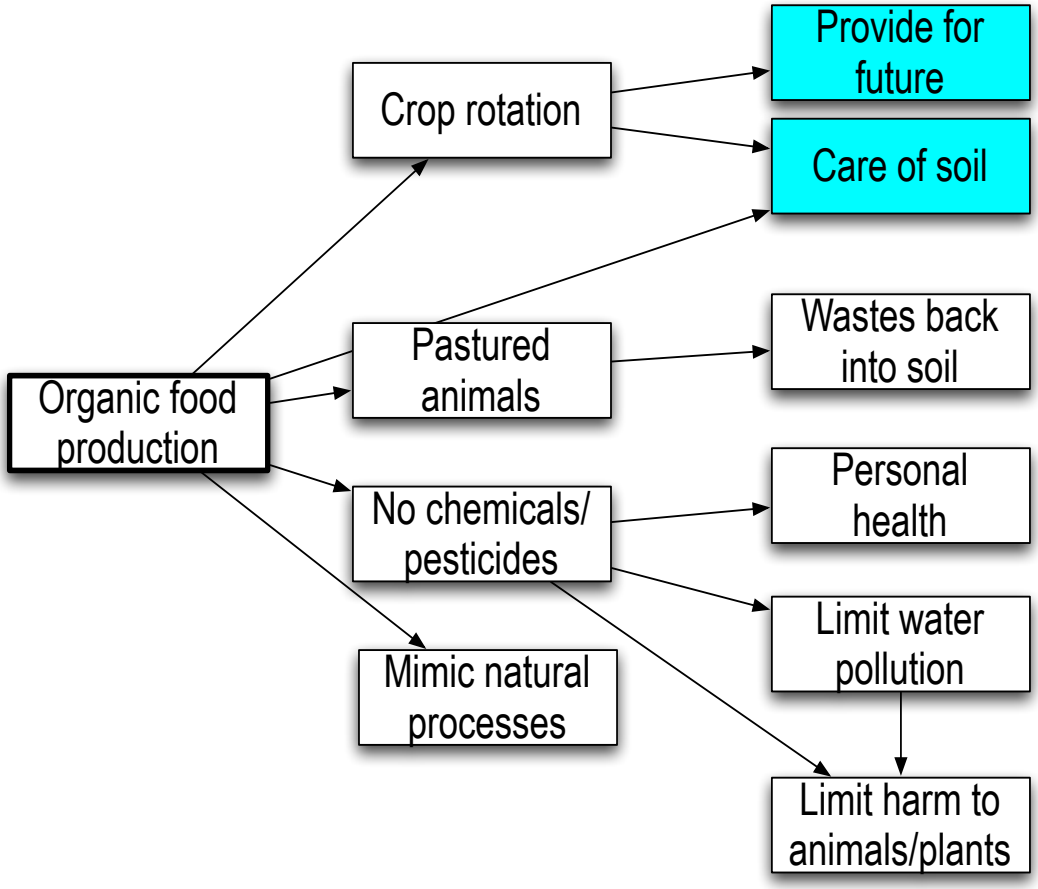


Figure 3e: Raising animals for food

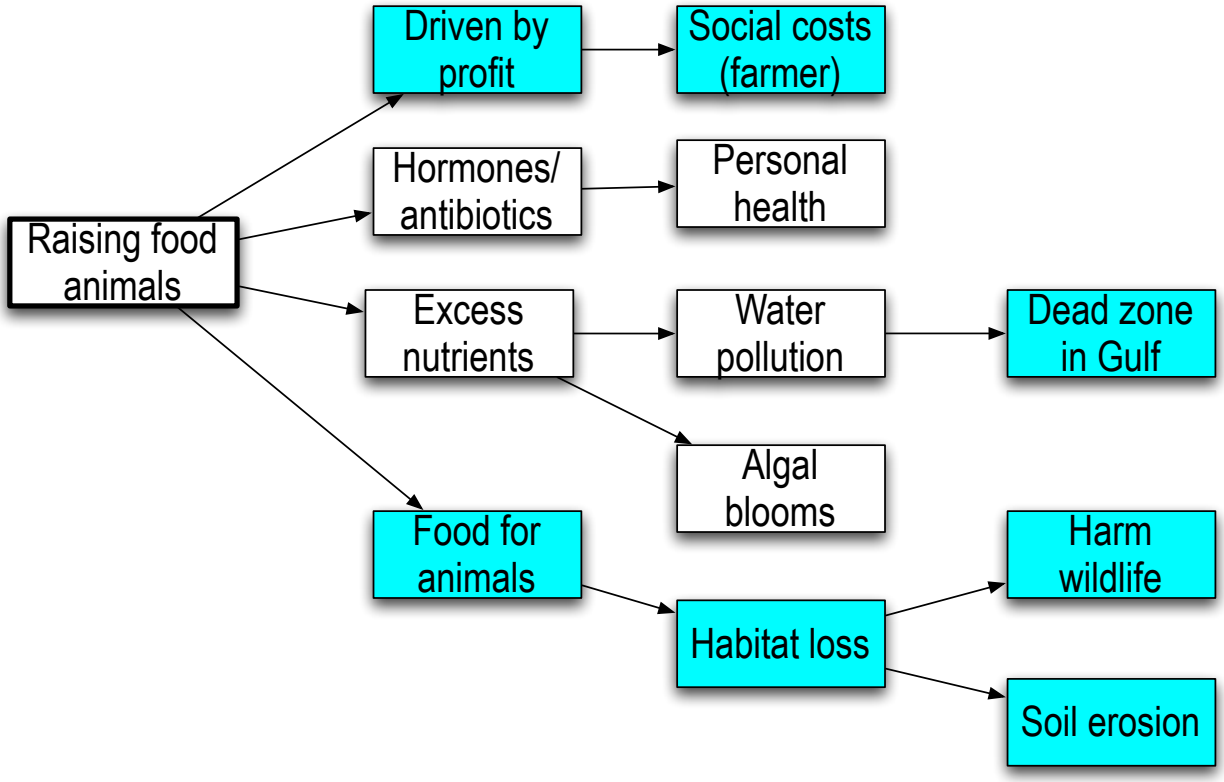
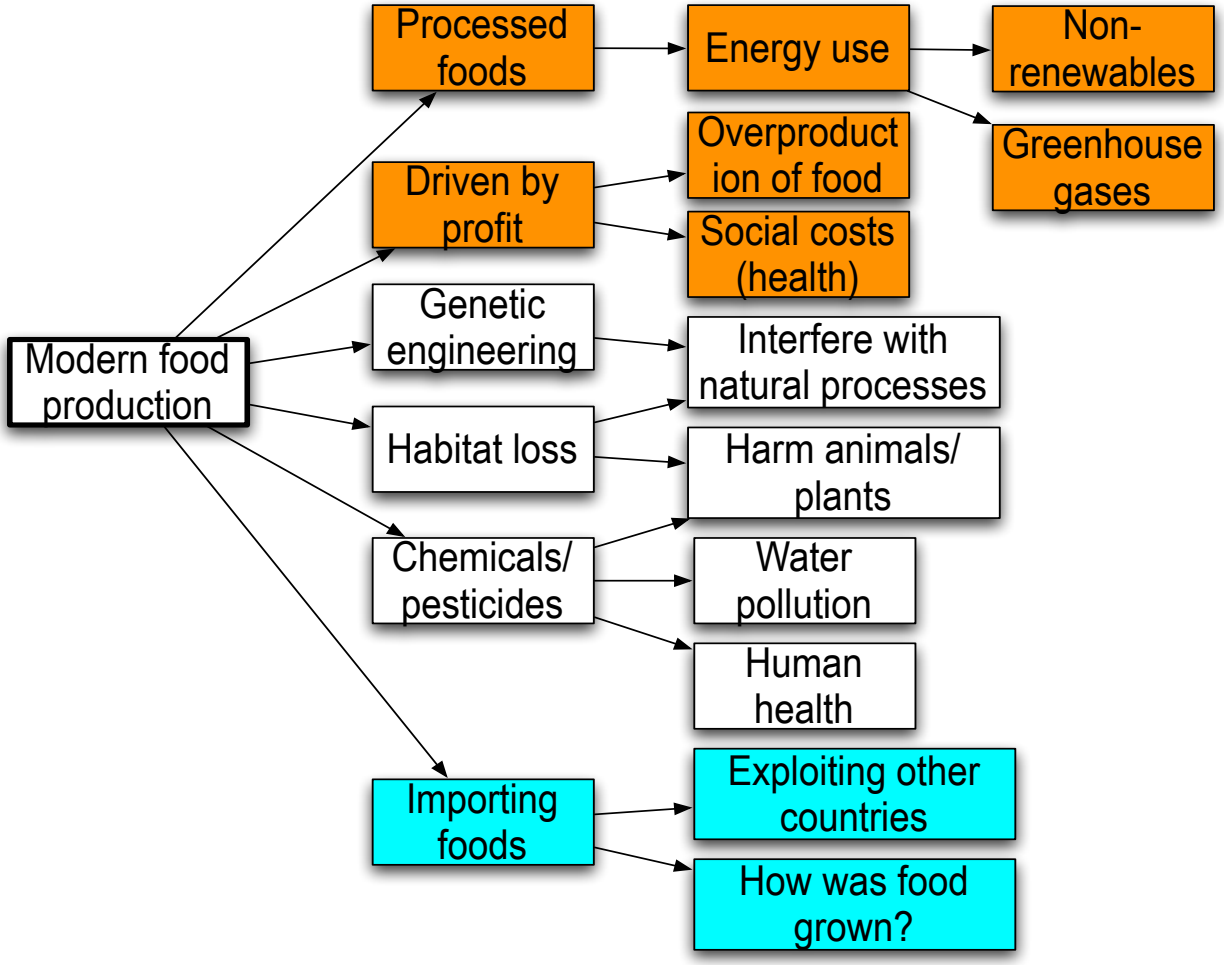


Figure 3f: Modern food production



Local food production was connected to fossil fuel use (a non-renewable resource) and to the fact that many students wanted to know where their food came from (and how it was grown) (Figure 3c). A randomly recruited student (focus group 'RF4') noted the diverse local agriculture of Michigan, i.e., the Student Organic Farm, and wondered why MSU couldn't take better advantage of these resources. Discussions among students from environment and agriculture programs (focus group 'PF2') noted the connections between transport, fossil fuel use, global warming and ozone depletion, as well as a reduced ability to provide for future generations (interview 'PI4').

The environmental 'goods' associated with organic food production were similar among all students (Figure 3d). Organic food production was associated with reduced chemical and pesticide use, better management of excess nutrients, and (as already noted) personal health benefits. Many students mentioned crop rotation, and the fact that organic production often mimics natural ecological processes. Only purposively recruited students made specific reference to care for the soil (three of the four focus groups and interviews), and being able to provide for future generations (interview 'PI4').

A number of students noted the negative environmental outcomes of raising animals for food (in two of the ten randomly recruited focus groups, and three of the four purposively recruited focus groups and interviews); these negative outcomes included the use of hormones and antibiotics (considered harmful to their personal health), as well as excess nutrients contributing to water pollution and algal blooms (Figure 3e). Purposively recruited students also discussed the fact that livestock production seems to be driven by profit, and that there were social costs for the farmer (in the form of debt) (focus group 'PF3'), as well as the fact that producing feed for livestock often results in habitat loss, which harms wildlife and can lead to soil erosion. One student drew a further connection between water pollution from livestock operations and the 'dead zone' in the Gulf of Mexico (interview 'PI4').

Finally, modern food production practices in general were also targeted, with concerns about genetic engineering, habitat loss and the use of chemicals and pesticides leading

to negative ecological and human health effects (Figure 3f). One purposively recruited focus group discussed the prevalence of imported food, noting that other countries may have lax environmental regulations and/or be forced to produce crops for export to the detriment of native food production (focus group 'PF3'). One randomly recruited student (focus group 'RF6') discussed the energy demands of food processing, linking this to demands on non-renewable fossil fuels and greenhouse gas emissions, while another (focus group 'RF2') made a connection between profit, food overproduction, and human health costs (the production of huge *quantities* of food, as opposed to *quality* food).

4. Discussion

One of the purposes of these focus group and interview discussions was to capture a full range of objectives that student participants associated with their food choices, with an eye to identifying if and when pro-environmental objectives factor into these choices. Unprompted, concern for the environment *did* play into students' food choice, i.e., students mentioned their desire for organic, unprocessed and vegetarian foods, although this was observed most frequently with students who were purposively recruited out of environmental and agriculture programs. When the discussion turned to exploring the connection between food choice and the environment, students elaborated on their concerns regarding food waste, local food and long-distance transport, organic food production, industrial animal production, and the general practices of modern food production.

It should be noted, however, that objectives relating to taste, health, enjoying the dining experience, and safety were extensively discussed as well, and this is in keeping with what has been found in other studies (Chambers et al., 2007; Chang & Zepeda, 2004; Lockie, Lyons, Lawrence, & Mummery, 2002; Weatherell, Tregear, & Allinson, 2003; Zepeda, Chang, & Leviten-Reid, 2006). For example, in a discussion of organic food demand, Zepeda et al. (2006) identified such attributes as taste, health/nutrition, fresh, appearance and quality as motivating food purchases among organic and 'conventional' shoppers alike. Chang and Zepeda (2004) generated a similar list of factors in focus group discussions of organic foods, but also added such issues as the sensory attributes of foods, their level of processing and if the foods honored social and ethical concerns. Weatherell et al. (2003: 241) further notes that:

> …although fair levels of awareness and concern for wider food-related issues may exist within the population, which would 'push' consumers towards local foods, in practice many will only act upon these concerns if the offerings meet their normal, food intrinsic and practical needs, thus pulling them away [from local foods].

It goes without saying that any efforts aimed at meeting environmental sustainability goals (or health-related goals) via the food that is offered at Michigan State University should also take into account the other objectives, e.g., taste, health or convenience, that students bring with them to the dining hall[17]. The results of the ranking and rating exercise also reinforce this point.

[17] An informal discussion with key Residential and Hospitality Service (RHS) personnel (Assistant Vice President of Housing and Food Services, University Housing Associate Director, RHS Sustainability Officer, Director of Culinary Services) echoed the food related objectives of students. When asked about the factors that must be considered when sourcing and planning meals for MSU's dining halls, such issues as freshness, variety, consistency, comfort (homestyle meals), utilizing and displaying the skill of MSU's chefs, achieving a restaurant feel (both with

Overall, the means-ends objectives network developed out of discussions with students from environmental/agriculture programs did differ in subtle but important ways from the objectives network of randomly recruited students (see Figure 1). Although randomly recruited students mentioned such issues as organic, vegetarian, pasture-raised and natural foods, only one individual made the connection to the health of the environment through the consumption of pasture-raised and natural/unprocessed products. Otherwise randomly recruited students mentioned these objectives, i.e., organic, vegetarian, and natural, exclusively in relation to health or sensory outcomes.

On the other hand, when students from environment/agriculture programs mentioned organic foods, local/Michigan foods and vegetarianism, they made consistent reference to the environmental *and* ethical benefits of such choices. However, these same students did not draw a connection between eating natural or pasture-raised foods and pro-environmental outcomes. In the end, perhaps one key difference in the connections between food choice and environmental issues that these students spontaneously drew was in the number of sessions from which these connections emerged: in only one of the ten randomly recruited focus groups and interviews vs. three of the four purposively recruited focus groups and interviews.

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the food served, and in the design of the dining halls), and honoring the religious and cultural practices of students were all mentioned. In terms of objectives relating to the environment, environmental sustainability – overall – was a very important goal (on par or even above their fiduciary responsibility); purchasing local and Michigan-grown foods was also linked to positive environmental outcomes, as was finding ways to facilitate the development of greater agricultural capacity within Michigan (particularly in the area of animal products).

The final discussion centered on a question that explicitly drew a connection between food and environmental issues, and here the connections that students drew between their food choice and the health of the environment were similar among both groups (randomly vs. purposively recruited) (see Figure 3). Practices such as wasting food, organic and local food production, dining hall practices, animal production, and modern agricultural practices, as well as more specific issues such as greenhouse gas emissions, wasteful resource use, soil exhaustion, wanting to know where food comes from, and providing for future generations, were mentioned in all groups and interviews. The key areas where randomly vs. purposively recruited students differed was in their description of the environmental negatives emerging out of animal production practices (a more extensive list of issues identified by purposively recruited students), and the environmental negatives emerging out of modern agricultural practices in general (a more extensive list of issues identified by randomly recruited students).

Ultimately, these results can set the stage for further work on improving delivery of food choices to students at Michigan State University, particularly in the context of the university's environmental sustainability goals. First, and as students alluded to in the discussion sessions, a campus-wide information campaign should be put in place to help students make the connections between what they choose to eat and its ultimate impact on the environment. This campaign could include such issues as food waste, choosing local and organic, consuming less meat, reducing energy and water demands,

and reducing the amount of materials that go to landfill (including food waste)[18]. While this suggestion does seem to fly in the face of much of what has already been discussed in this dissertation, i.e., that information and education alone are often not effective in motivating behavior change, it is nevertheless incumbent on managers of MSU's food system to initiate a communication effort alongside other types of interventions aimed at making students' food choices more sustainable. Such a communication effort would lay the groundwork for: i) increasing awareness and stimulating discussion (Ratner et al., 2008; Steg & Vlek, 2009), ii) identifying or reinforcing what is (or is not) acceptable or common behavior (norms) (Cialdini, 2003; Stern & Dietz, 1994), and iii) supporting interventions, e.g., defaults or personalized feedback, directed at achieving health or environmental objectives via individual behavior change.

Second, these results provide the necessary context for a behavioral intervention study that comprises the last chapter of this dissertation. The aim of this behavioral intervention study is to test hypotheses relating to the efficacy of defaults, information provision, and pro-environmental value orientation in motivating pro-environmental behavior. The discussions with students identified some food choices that could potentially be used as the default menu offering in campus dining halls. The food choices – as identified by students – that have a connection to positive environmental

[18] Further discussions with students and RHS staff could expand and refine this list of environment-related objectives, as well as generate ideas as to how to best achieve them in practice, e.g., composting food waste, energy generation from food waste, reducing portion size and tray use, and making local, organic and Michigan products more available in the dining halls.

outcomes included organic, local, and vegetarian, as well as offering smaller portion sizes.

While Wansink and colleagues have done extensive work on the influence of plate, cup, and packaging size on food portions and the amount of food consumed (see Wansink, 2004 for a review of this research), to my knowledge no research has been done on offering organic, local or vegetarian foods as a default offering – and with the ultimate aim of fostering more environmentally sound food choices. Of these three possibilities, vegetarian choices offered the greatest flexibility in terms of what could be described and provided on the experimental menus in the default study. In addition, consuming less (or no) meat and other animal products has been more consistently linked to a variety of positive environmental outcomes, i.e., reductions in greenhouse gas emissions, water and air pollution, or intensity of resource use (Carlsson-Kanyama, 1998; Garnett, 2009; Reijnders & Soret, 2003; Smil, 2002; White, 2000).

The results from this study also complement previous qualitative work with consumers of organic, local, and vegetarian foods (Chambers et al., 2007; Chang & Zepeda, 2004; Fox & Ward, 2008; Lockie et al., 2002; Makatouni, 2002; Weatherell et al., 2003; Zepeda et al., 2006). What is different, though, is that these focus groups and interviews allowed MSU freshmen to freely express the objectives that are important to them when making a food choice, as well as why these objectives are important, but without any specific agenda being articulated to them by the researcher (at least at the beginning of the session). In other words, had the recruitment letters stated that the

purpose of the focus groups and interviews been to explore the connection between environmental sustainability and food choices, students may have stifled or altered their responses to fit this agenda. In other words, students may have felt pressure to shape their answers had they been told that the sessions were about environmental sustainability, organic or local foods (Fisher, 1993).

Finally, structuring the focus group and interview discussions to reveal means and ends objectives was a novel application of a key step in the structured decision making process. In this study, the means-ends objectives networks allowed for an easy comparison between different groups, i.e., randomly vs. purposively recruited, and interview vs. focus group. The means-ends objective networks also function as kind of a 'mental model' of what is important to students when they make their food choice, pinpointing areas where education and information efforts could be used to reinforce, explain and elaborate the connections between objectives (Morgan et al., 2002).

Traditionally, however, the means and ends objectives network would be used as part of a structured and iterative approach to solving a specific decision problem, e.g., "What foods should be served in MSU's dining halls". In this case, the list of fundamental (ends) objectives generated through discussions with students would be used to evaluate the different options that are available to MSU in terms of procuring its food supply, e.g., going with a large multinational food service company, independent procurement from producers, choosing local or organic food producers, or even eschewing meat entirely.

The use of ends objectives to gauge the suitability of various decision options (as opposed to relying on means objectives) counteracts the tendency to focusing too narrowly on available or salient objectives and encourages a more creative and constraint-free approach to solving decision problems (Keeney, 1996).

5. Study Limitations and Conclusions

Although there were references to the number of focus groups and interviews in which certain topics were raised, this does not imply that these results can be generalized (Zepeda et al., 2006). The purpose was simply to draw comparisons between the randomly and purposively recruited students who participated in this study. However, it should also be noted that the purposively recruited students knew each other prior to participating in the focus group discussions (via their enrollment in the residential RISE program) and thus may have been more comfortable discussing topics relating to their food choices and related environmental issues in front of each other.

In addition, there was some difficulty in finding and recruiting *freshmen* students who were part of an environmental or alternative agriculture program on campus. Thus, a future study might expand the sampling frame to include sophomores (who make up the next largest group in MSU's residence halls), and thus increase the 'pool' from which to recruit different subgroups of students. Similarly, more effort could be made to fill focus groups with students who come from the same academic program or campus

organization – and hopefully ease some of the inhibitions that the randomly recruited students may have felt when speaking in front of a roomful of unfamiliar people.

This exploratory study served to capture a broad list of students' food-related objectives and the connections between them. Although many students made connections between their personal food choice (or the food and agriculture – related practices of others) and a variety of negative environmental outcomes, these results did reveal the need for an information campaign that would help students to further identify and clarify these connections (particularly since achieving environmental sustainability goals is an important campus-wide and Residential and Hospitality Services objective). Ultimately, these results inform the last chapter of this dissertation, which examines the use of a behavioral intervention (in this case a default food choice) to achieve pro-environmental outcomes (as opposed to solely relying on information provision or the intrinsic motivation (e.g., values or worldview) of individuals).

APPENDICES

Appendix A

Questions and probes used during focus groups and interviews

Questions and probes used during focus groups and interviews

Question 1: (a) In terms of your experience with MSU residential dining, what has been your preferred meal this year? (b) What is it about this meal that makes it so appealing to you?

Probe with 'why is this [factor, item, characteristic] important to you?'

Question 2: Thinking about the foods you choose to eat more generally (both on and off campus), what are all of the factors that are important to you in terms of your decisions to either (a) eat certain foods or (b) not eat certain foods?

Probe with 'why is this [factor, item, characteristic] important to you?'

Question 3: In the following table, we present some factors that other students have told us are important to them when making their food choices in MSU residential dining halls. In the first column, please rank each factor from most to least important when it comes to what <u>you</u> consider when making food choices on campus. In the second, column, please rate each factor on the scale provided. We realize that there may be other factors, not shown here, that are also important to you. So we've left some space in the table for you to fill these in (if you want).

First version of ranking and rating exercise

Factor	Rank	Rating (Please circle your response) Not at all Important									Somewhat Important / Very Important
Freshness		1	2	3	4	5	6	7	8	9	10
Healthy		1	2	3	4	5	6	7	8	9	10
Taste		1	2	3	4	5	6	7	8	9	10
Convenience		1	2	3	4	5	6	7	8	9	10
How it looks (Appearance)		1	2	3	4	5	6	7	8	9	10
Locally grown (grown within 100 miles)		1	2	3	4	5	6	7	8	9	10
Organic		1	2	3	4	5	6	7	8	9	10
Vegetarian		1	2	3	4	5	6	7	8	9	10
Michigan grown		1	2	3	4	5	6	7	8	9	10
Low fat		1	2	3	4	5	6	7	8	9	10
Consistency		1	2	3	4	5	6	7	8	9	10
Fair trade		1	2	3	4	5	6	7	8	9	10
Animal welfare		1	2	3	4	5	6	7	8	9	10

Second version of ranking and rating exercise

Factor	Rank	Rating (Please circle your response) Not at all Important				Somewhat Important					Very Important
Variety		1	2	3	4	5	6	7	8	9	10
Consistency/Reliability		1	2	3	4	5	6	7	8	9	10
Natural		1	2	3	4	5	6	7	8	9	10
Food Safety		1	2	3	4	5	6	7	8	9	10
Freshness		1	2	3	4	5	6	7	8	9	10
Organic		1	2	3	4	5	6	7	8	9	10
Quality		1	2	3	4	5	6	7	8	9	10
Convenience		1	2	3	4	5	6	7	8	9	10
Locally grown (grown within 100 miles)		1	2	3	4	5	6	7	8	9	10
Healthy		1	2	3	4	5	6	7	8	9	10
Vegetarian		1	2	3	4	5	6	7	8	9	10
Michigan grown		1	2	3	4	5	6	7	8	9	10
Taste		1	2	3	4	5	6	7	8	9	10
Familiarity		1	2	3	4	5	6	7	8	9	10
Low fat		1	2	3	4	5	6	7	8	9	10

Question 4: Thus far, we've talked about a number of different factors that you consider when making decisions about what to eat. In terms of the <u>five</u> factors that are <u>most important</u> to you, tell us a little but about how you characterize these. For example, if you desire <u>healthy food</u>, what are the kinds of things you look for or consider when you try and determine if a certain meal is healthy or not?

Probe also with 'why is this [factor, item, characteristic] important to you?' as appropriate

Question 5: Increasingly, people talk about environmental sustainability concerns as something that helps to inform their food choices. To what extent do environmental sustainability concerns play a role in your own decisions about what to eat? What kinds of issues do you think about in this regard?

Probe with 'how does this [factor, behavior, choice, issue] affect the environment?'

Or 'What are some of the environmental negatives (or positives) that are associated with this [factor, behavior, choice, issue]?'

Or just have students define 'environmental sustainability' in their own words

Appendix B

Coding table: identifying objectives (themes) and differentiating means and ends objectives

Table 5: Coding Table

CODES for OBJECTIVES (THEMES) with ADDITIONAL DESCRIPTORS	***MEANS or ENDS OBJECTIVE?***
(Means Objectives)	
FRESH[19] *Just prepared* *Not sitting out, proper temperature and texture* *Off the grill* *Minimal handling*	Fresh → **Healthy diet** Fresh → **Good taste/positive sensory experience**
TEXTURE *Crunchy, crisp* *Fresh foods, fried foods*	Proper texture → **Good taste/positive sensory experience**
COLORFUL *Antioxidants* *Can signal freshness*	Colorful → **Healthy diet** Colorful → **Good taste/positive sensory experience**
SMELLS *Good smells, bad smells* *Signals freshness, proper preparation*	Smells good → **Good taste/positive sensory experience**
VARIETY *Lots of options, choices, toppings, ingredients* *Not boring, encourages you to eat* *Creative – new food combinations*	Lots of variety → **Good taste/positive sensory experience**
QUALITY *Expensive, not cheap* *Good cuts (of meat)* *Quality brands, organic foods/brands* *Can taste it, tastes rich*	Quality foods → **Good taste/positive sensory experience**

[19] For reasons of space and clarity, objectives are shortened to single words/short phrases. Assume – unless otherwise specified – that students desired to seek out foods and/or consume more foods with these characteristics.

Table 5: (cont'd)

BALANCED/USDA FOOD PYRAMID *Try to include something from all food groups* *Don't just eat one kind of food* *Bit of meat, vegetables, foods that complement each other* *Everything in moderation*	Balanced → **Healthy diet** Following the USDA food pyramid → **Healthy diet**
FRESH FRUIT *Apples, grapes, melons*	Fresh fruit→ **Healthy diet** Fresh fruit→ **Good taste/positive sensory experience**
VEGETABLES *Salad, steamed vegetables*	Vegetables→ **Healthy diet** Vegetables→ **Good taste/positive sensory experience**
RED MEAT *Hamburger, steak, roast, prime rib*	Red meat→ **Healthy diet** Red meat→ **Good taste/positive sensory experience**
CHICKEN/FISH	Chicken/fish→ **Healthy diet** Chicken/fish→ **Good taste/positive sensory experience**
DAIRY *Milk, yoghurt, parfait, ice-cream*	Dairy→ **Healthy diet** Dairy→ **Good taste/positive sensory experience**
WHOLE GRAINS *Cereal*	Whole grains→ **Healthy diet** Whole grains→ **Good taste/positive sensory experience**
CONSISTENT/RELIABLE *Have had food before, don't have to wonder if it is good* *Can rely on this food to be good* *Something to fall back on, will always be there*	Consistent/reliable→ **Good taste/positive sensory experience**
LIKE AT A RESTAURANT *Foods are recognizable (e.g., like KFC, Subway, Panera), creates good expectations*	Like at a restaurant→ **Familiar/Comforting → Good taste/positive sensory experience** Like at a restaurant→ **Good taste/positive sensory experience**

Table 5: (cont'd)

LIKE AT HOME *Like what is served at home, eaten with family* *Mother/father/grandparents make this* *'Home-style' foods, e.g., grilled cheese and tomato soup* *Religious considerations*	Like at home→ **Familiar/Comforting → Good taste/positive sensory experience** Like at home → **Good taste/positive sensory experience**
FAMILIARITY/COMFORT *Get enjoyment out of recognizing these foods* *Home-style is comforting, a reminder of home or country, good times*	Familiar/Comforting → **Good taste/positive sensory experience** Familiar/Comforting → **Positive dining experience**
CONVENIENT *Easy to eat, eat on the run* *Waiting times, avoid long lines* *Location (near class, bus loop, etc.)* *Need time to study*	Convenient → **Positive dining experience**
MODERN/OPEN/LIGHT *Seeking dining halls that are like a restaurant (The Gallery at Snyder-Philips)* *Not dark and crowded* *Not like a dining hall*	Modern → **Positive dining experience**
FUN ATMOSPHERE *TVs, couches* *Exclusivity (Captain Peapod in Shaw)*	Fun atmosphere → **Positive dining experience**
CLEANLINESS *Dining hall and serving area are clean* *Plates, glasses and cutlery are clean* *Staff washes hands, wears gloves*	Cleanliness → **Positive dining experience** Cleanliness → **Safe food**
NO CONTAMINATION *Food is clean, not dropped on floor* *No hairs in food*	No contamination → **Positive dining experience** No contamination → **Safe food**

Table 5: (cont'd)

SKILL IN PREPARATION *Taking care* *Following procedures* *Culinary students* *Within the capabilities of kitchen staff*	Skill in preparation → Presentation → **Positive dining experience, Good taste/Positive sensory experience** Skill in preparation → Food properly prepared → **Safe food, Positive dining experience, Positive sensory experience**
MADE TO ORDER *Give instructions to chef* *Make food yourself, e.g., sandwiches, salads, tacos* *Personalize or customize the food*	Made to order → Food properly prepared → **Positive dining experience, Positive sensory experience**
PREPARED IN FRONT OF YOU *Like to watch food being prepared* *Like to know how food is prepared* *Make sure proper ingredients and portions are used*	Prepared in front of you → Food properly prepared → **Safe food, Positive dining experience, Positive sensory experience**
FOOD IS PROPERLY PREPARED *Food is as expected* *Proper temperature, texture, taste* *Proper safe food handling procedures followed*	Food properly prepared → **Safe food, Positive dining experience, Positive sensory experience**
VISUAL APPEAL/PRESENTATION *Food looks fresh, freshly made* *Grilling at Snyder Philips* *Carving roast beef* *Garnishes, sauces*	Presentation → **Positive dining experience, Good taste/Positive sensory experience**
PASTURED *Animals kept on pasture, not in pens*	Pastured → **Health** Pastured → **Positive environmental outcomes**
ORGANIC	Organic → **Health** Organic → **Positive environmental outcomes** Organic → **Good taste/positive sensory experience** Organic → **Address ethical concerns**
LOCAL/MI Grown *Economic benefits*	Local → **Good taste/positive sensory experience** Local → Fresh → Good taste/positive sensory experience Local → **Address ethical concerns**

Table 5: (cont'd)

VEGETARIAN *Avoid meat, vegan* *Ethical concern with eating animals*	Vegetarian → **Health** Vegetarian → **Positive environmental outcomes** Vegetarian → **Address ethical concerns**
UNPROCESSED/NATURAL *Not processed* *No/minimal additives* *Not man-made, made in a factory*	Unprocessed/Natural → **Health** Unprocessed/Natural → **Positive environmental outcomes**
(Ends Objectives)	
ADDRESS ETHICAL CONCERNS	Cruel treatment of animals, economic well-being of farmers, health of farmers, for the common good, well-being of other countries that produce our food, "It's a conscience thing" (Female student, focus group PF3)
POSITIVE ENVIRONMENTAL OUTCOMES	There is an environmental toll of <u>not</u> choosing these types of food
ENSURE A HEALTHY DIET	Meeting body's nutritional needs, meeting medical requirements (e.g., diabetes), feeling good/energetic after eating, have the ability to participate in sports, concentrate in school, maintain or lose weight, avoid the 'freshmen 15'
GOOD TASTE/POSITIVE SENSORY EXPERIENCE	Won't eat food that doesn't taste good! Seeking out a variety of tastes, textures and ingredients because of enjoyment Don't want to be bored by food Clear enjoyment of eating certain foods, e.g., excited, 'love' the food, look forward to the food
POSITIVE DINING EXPERIENCE	Want to enjoy the surroundings "[The Gallery] The kind of place you could bring a date to" (Male student, interview 'RI10') Seek out favorite spots to eat Don't want to feel like they are eating in a cafeteria Want to feel like you are eating at a restaurant Influences how you feel about the food you are eating
FOOD IS SAFE	Don't want to get sick from food Have had experience in the past with food-borne illness, and want to avoid this in future

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CHAPTER 4

Motivating pro-environmental food choices: The role of value orientation, information provision, and a default behavioral intervention

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Abstract

Simple changes in our individual food consumption habits can result in significant gains in sustainability, e.g., in reducing the land, water and resource requirements for food production or in reducing contributions to climate change. Despite positive attitudes and intentions with regard to the health of the environment, however, there remains a need to expand the adoption of pro-environmental behaviors in this and a variety of other arenas. The literature to date suggests that neither relying on information provision and education campaigns, nor on the intrinsic motivation of individual value orientations, may be effective in motivating behavior change in a more pre-environmental direction. Instead, efforts to design the decision-making environment to make pro-environmental choices more convenient, i.e., default choice, may be one way to bridge the disconnection between pro-environmental attitudes and behavior. Thus, for this study, an experiment was designed to compare the effect of a default behavioral intervention and information provision, as well as such covariates as value orientation, pro-environmental worldview, and gender, in encouraging pro-environmental behavior (choice of a meat-free food option). Controlling for other variables, the default menu configuration was a significant predictor of choice and increased the odds of choosing a vegetarian meal when compared to non-default menu. The presence of information was not a significant predictor of choice, and none of the interaction terms were a significant addition to the model. In terms of the variables gathered in an accompanying survey, only gender was a significant additional predictor of meat-free meal choice. Neither an individual's values nor worldview contributed to directly to the model. Default interventions and other behavior-based decision-structuring efforts can be important

tools in motivating changes, and can also serve to complement information and education efforts over the long term, as long as concerns about consumer autonomy are addressed.

1. Introduction

In light of an ever-increasing human population, there are persistent questions about the environmental and social sustainability of food production and consumption practices in developed countries. Reflective of this, considerable effort has been directed at finding ways to lessen the environmental impact of what we eat, e.g., choosing locally produced or organic foods, or moving to a more plant-based diet (de Boer, Boersma, & Aiking, 2009; Deckers, 2010; Feenstra, 1997; Grunert & Juhl, 1995; Smil, 2002). In contrast to the drastic and potentially costly changes that will have to occur to address automobile use or the design of homes and communities, these simple changes in our individual food consumption habits (what, and how much we eat) can result in significant gains in sustainability, e.g., in reducing the land, water, and resource requirements for food production or in reducing contributions to climate change (Kim & Neff, 2009; Peters et al., 2007; Reijnders & Soret, 2003; Weber & Matthews, 2008; White, 2000)[20]. However, despite the significant positive impact that changes in individual behavior can potentially have (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009), there remains a need to expand the adoption of pro-environmental behaviors in a variety of arenas.

[20] Kim and Neff (2009) recommend three online carbon calculators (Bon Appétit, Conservation International, and The Nature Conservancy) for estimating potential reductions in greenhouse gas emissions with dietary changes (and as compared to other household-level changes in behavior, e.g., household heating and driving behavior). Although these authors note that the estimates from all such calculators should be interpreted with caution because of the limited information available on greenhouse gas emissions from the U.S. food system, they suggest that this should not be a reason to ignore the contribution of individual dietary choices to global climate change (see also Deckers 2010).

While information provision and educational campaigns are commonly employed to motivate pro-environmental behaviors, research has shown these efforts to be more effective at creating positive attitudes towards the environment and/or increasing knowledge about environmental issues than changing actual behaviors (Ratner et al., 2008; Steg & Vlek, 2009). A different, and potentially more effective, approach involves designing the decision-making *environment* to make pro-environmental choices more convenient, i.e., as the default choice. Decision-making interventions like defaults may be one way to encourage pro-environmental behaviors (Pichert & Katsikopoulos, 2008; Thaler & Sunstein, 2008), beyond a sole reliance on the thoughtful incorporation of information or on the intrinsic motivation of those with a pro-environmental worldview or value set. With this in mind, an experiment was designed to test the effectiveness of a default behavioral intervention, information provision, individual social psychological factors and gender (as measured in an accompanying survey) in motivating environmentally responsible food choices.

The setting for this research was Michigan State University (MSU) in East Lansing, Michigan, where a campus-wide Environmental Stewardship program has been employed whose overarching goal is to reduce the university's environmental footprint[21]. In particular, the experiment was conducted within the context of the

[21] Although a broad consensus on the definition and interpretation of 'sustainability' in general, and environmental sustainability in particular, has yet to be achieved (Aiking & de Boer, 2006; Robinson & Smith, 2002; Thompson, 2007) the university's environmental stewardship program operationalizes sustainability in terms of systemic efforts that will ultimately lead to measurable reductions in greenhouse gas emissions and resource use (e.g., energy, water and land – often represented by indices like the 'environmental footprint'), as

university's food system, with the aim of not only investigating the relative efficacy of a default behavioral intervention, but also providing recommendations to culinary services managers in terms of incorporating environmental sustainability goals in the selection and presentation of foods in campus dining halls. MSU is a large university with over 15,000 students living on-campus, and with a culinary services team that serves over 35,000 meals per day. Thus, any effort to address environmental health and sustainability goals via the university food system would have a great impact. The benefits of these efforts would be seen both in terms of the volume of food served at the institution, as well as in terms of providing concrete suggestions as to how individuals and institutions can more effectively address concerns about environmental health and sustainability.

The production/consumption of animal products, the distance that food travels, and climate-controlled food storage are commonly cited contributors to environmental problems like habitat loss, degradation of air, water and soil quality, and climate change (Carlsson-Kanyama, 1998; Gerbens-Leenes & Nonhebel, 2002; Weber & Matthews, 2008). Thus for the purposes of this experiment, a vegetarian or meat-free meal was used as the pro-environmental food choice.

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well as address other issues like habitat loss, and degradation of air, water, and soil quality. However, while campus environmental sustainability efforts within the university's food system provides the particular focus of this study, it is hoped that the insights achieved through this research can be applied to other facets of food choice, e.g., promoting healthy food choices, and in encouraging pro-environmental behavior in other domains, e.g., recycling, energy and water conservation.

It should be noted that vegetarian diets are not always environmentally sustainable, for example processed vegetarian foods and out of season items can contribute to a variety of negative environmental outcomes (Morris & Kirwan, 2006; Smil, 2002). However, a number of authors have pointed specifically to North American and European meat consumption habits (both in terms of the amount consumed, as well as the dependence on intensive/confinement systems for raising food animals) as a major challenge to achieving environmental sustainability goals (Pretty, Ball, Lang, & Morison, 2005; Reijnders & Soret, 2003; Smil, 2002; White, 2000). Finally, it should also be noted that vegetarian meals also offered the greatest variety of meal options for the purposes of this experiment.

2. Background Information

2.1. The role of values and beliefs in pro-environmental behavior

The values held by an individual are thought to be an important motivating force in the decision to engage (or to not engage) in behaviors that benefit the environment (de Groot & Steg, 2008; Dietz, Fitzgerald, & Shwom, 2005). Here, values are defined as enduring and trans-situational beliefs about the desirability of a particular behavior or 'end state' of being (Rokeach, 1979; Schwartz, 1996; Schwartz & Bilsky, 1987). Schwartz's Value Survey (1992) is a widely recognized and broadly employed method of capturing an individual's value orientation; and has allowed researchers the opportunity to correlate ten value types and four value dimensions (see Figure 4 below) with various behaviors, attitudes, and beliefs across a diverse array of cultures (Schultz & Zelezny, 1999; Schwartz, 1992; Schwartz & Bilsky, 1990).

Researchers documenting the relationship between values and pro-environmental behaviors have cited Schwartz's 'Universalistic' value orientation as an important motivator (Hansla, Gamble, Juliusson, & Garling, 2008; Vermeir & Verbeke, 2006). Building on this, others have sought to further differentiate the Universalistic orientation into 'Altruistic' and 'Biospheric' value orientations, with the former emphasizing equality, social justice, and consideration of other humans, while the latter emphasizes the intrinsic value of nature and respect for the natural world (consideration of *nonhuman* others) (de Groot & Steg, 2008; Stern & Dietz, 1994; Stern et al., 1998). While there has been mixed success in differentiating these Universalistic value orientation subtypes, the distinction between Biospheric and Altruistic values may become more apparent as larger portions of society adopt a view of the intrinsic value of nature and other species (Stern, Dietz, Abel, Guagnano, & Kalof, 1999).

Figure 4: Schwartz's 10 Value Types and 4 Motivational Value Orientations (from Schwartz 1996)

Value	**Value Dimension**
Power	Self-enhancement
Achievement	
Hedonism	
Stimulation	Openness to Change (Also Hedonism)
Self-direction	
Universalism	Self-transcendent
Benevolence	
Tradition	Conservation
Conformity	
Security	

Figure 4: (cont'd)
Note: 'Self-enhancement' and 'Self-transcendent' represent opposing ends of one value dimension; 'Openness to Change' and 'Conservation' define the other dimension.

A number of mechanisms connecting values and the decision to engage in pro-environmental behaviors have been proposed. These include the following: (i) that an individual's value orientation may make them more (or less) attentive to pro-environmental messages (Stern & Dietz, 1994), (ii) that values motivate individuals to seek out and actively process information prior to engaging in a new pro-environmental behavior (Biel et al., 2005; Verplanken & Holland, 2002), or (iii) that acting in opposition to one's values generates cognitive discomfort (Hoogland, de Boer, & Boersma, 2005; Schroder & McEachern, 2004). The connection between values and pro-environmental behavior can also be thought of as an indirect process of 'norm activation' (Schwartz, 1977; Stern, 2000), whereby personal norms are activated through an awareness of the negative consequences of one's actions and the recognition that one has the obligation and opportunity to take responsibility for those actions. Finally, values come into play when an individual is faced with having to make trade-offs among conflicting attributes or preferences (Dietz et al., 2005; Keeney, 1996). For example, people may be faced with the choice between foods that are perceived as healthy *vs*. those that taste good (Connors, Bisgoni, Sobal, & Devine, 2001), or whether to adopt a behavior that is beneficial to self (a private automobile) *vs*. one that is the better choice in terms of environmental outcomes (taking public transit) (Bamberg, Hunecke, & Blobaum, 2007; Garling, Fujji, Garling, & Jakobsson, 2003).

Experimental research has largely supported these connections. Drawing an individual's attention to the connection between a particular behavior and salient values can spur the decision to engage in more pro-environmental behaviors. For example, in a variety of experimental situations, priming altruistic or biospheric values has been shown to motivate people to make more environmentally responsible choices over lower cost or more convenient options, i.e., choosing television sets with environmentally friendly attributes (Grankvist & Biel, 2001; Verplanken & Holland, 2002), or selecting eco-labeled foods (Biel et al., 2005; Grankvist, Lekedal, & Marmendal, 2007).

Overall, studies of certain pro-environmental behaviors such as recycling, the use of public transit, and individuals' support for 'green electricity' programs suggests that individuals with altruistic, biospheric, or universalistic value orientations were more likely to engage in environmentally responsible behaviors (Clark, Kotchen, & Moore, 2003; Hopper & Nielsen, 1991; Nordlund & Garvill, 2003). Many studies have similarly identified these values in motivating more environmentally responsible or sustainable food choices (de Boer, Hoogland, & Boersma, 2007; Dietz, Frisch, Kalof, Stern, & Guagnano, 1995; Grankvist & Biel, 2001; Kalof, Dietz, Stern, & Guagnano, 1999; Vermeir & Verbeke, 2008).

However, a reliable connection between values and everyday pro-environmental behaviors may only exist for a small subset of the population (Biel et al., 2005; Verplanken & Holland, 2002). While individual value orientation may shift over time to become more conducive to the uptake of environmentally responsible behaviors (Stern

& Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995; Vermeir & Verbeke, 2006), many authors suggest turning to behavioral interventions and/or educational campaigns to effect pro-environmental behaviors in the short term (Abrahamse, Steg, Vlek, & Rothengatter, 2005; Biel et al., 2005; Schultz, Oskamp, & Mainieri, 1995).

2.2. Information provision and pro-environmental behavior

A common tactic to encourage environmentally responsible behaviors, including food choice, is to provide 'more' or 'better' information to consumers (Padel & Foster, 2005; Robinson & Smith, 2002). The basic idea behind these efforts at behavior change is that most people want to make the necessary changes, and only require information as to how to achieve their pro-environmental goals, be they with regards to recycling, energy conservation, or changing food consumption habits (Gardner & Stern, 1996). Interest in eco-labeling schemes (Howard & Allen, 2010; Loureiro & Lotade, 2005; McEachern & Warnaby, 2008; Teisl, Rubin, & Noblet, 2008) is reflective of this normative approach to behavior change, as are the many websites promoting sustainable food consumption and production. For example, the Sierra Club's 'The True Cost of Food' campaign aims "To encourage people to think about the environmental impacts of their consumption choices by providing specific information."[22]

However, past research has shown that the provision of information on its own can be of limited utility in facilitating behavior change (Ratner et al., 2008; Steg & Vlek, 2009;

[22] http://sierraclub.org/truecostoffood last accessed January 20, 2011.

Stern, 1999). For example, habitual behaviors tend to be resistant to information provision unless accompanied by a disruption of the environmental cues that are triggering the behavior (Verplanken & Wood, 2006). Similarly, while information campaigns have been shown to increase knowledge and intentions to perform a behavior (Abrahamse et al., 2005), behavior change is typically seen only when that information is accompanied by additional efforts at – for example – providing feedback about or removing barriers to the behavior in question (Gardner & Stern, 1996; Pichert & Katsikopoulos, 2008; Schultz et al., 1995; Stern, 1999).

2.3. Behavioral interventions to facilitate pro-environmental behavior

One type of intervention that has not, until recently, received a lot of attention is the manipulation of decision contexts to take into account the preference for a more convenient or 'default' option. This type of intervention has proven to be a powerful tool in facilitating a variety of behaviors, including 'green' energy use (Pichert and Katsikopoulos 2008), the promotion of healthy eating (Downs et al. 2009; Milkman et al. 2008), encouraging organ donation (Johnston and Goldstein 2003), as well as saving for retirement (Ratner et al. 2008; Thaler and Sunstein 2008). However, to this author's knowledge, a default intervention has not been used to facilitate pro-environmental food choices.

The inspiration for many behavioral interventions, and specifically the use of defaults, comes from the observation that people don't always make decisions that are in their own best interest (Milkman et al., 2008a; Ratner et al., 2008; Thaler & Sunstein, 2008).

Work from a variety of fields, including environmental psychology and behavioral decision research, suggest a number of reasons for this disconnect. Decision-making can be hindered by time pressure and limits to cognitive capacity; for example Shiv and Fedorikhin (1999) showed that individuals provided with a cognitively demanding task tended to choose unhealthy snacks. In these situations, people may also rely on decision shortcuts or heuristics that – while sometimes useful – can lead to suboptimal decision-making, e.g., allowing the amount of food consumed to be dictated on the size of the container, rather than a feeling of fullness or satiety (Scheibehenne et al., 2007; Wansink, 2004). In addition people may not be fully appreciative of the fact that small, seemingly inconsequential decisions, e.g., putting off exercise for just one day or driving a private automobile to work rather than biking or taking public transit, can have significant negative impacts for themselves and others over the long term (Ratner et al., 2008).

The difficulty for an individual in making decisions that are in their own best interest has also been portrayed as the result of a conflict between the 'want' self and the 'should' shelf, or between a 'hot' state and 'cold' state (Ariely & Loewenstein, 2006; Loewenstein, 1996; Milkman et al., 2008a), where visceral and more immediate factors (which tend to have immediate benefits, and where costs accrue over a much longer time scale) tend to dominate at the expense of longer-term considerations (where costs may be borne up front, and benefits appear only later). A classic example in this domains deals with the decision to engage in risky sexual behavior (Ariely & Loewenstein, 2006), where individuals in a 'hot' or aroused state would be willing to

engage in behaviors that their 'cold' or rational selves would find repugnant. A similar pattern was seen in a study of food orders in an online grocer (Milkman et al., 2008b), where orders made in advance (ostensibly by the thoughtful, rational self) tended to have a greater proportion of healthier or 'should' foods than last-minute grocery orders (which would have been ordered by hungry or time-stressed individuals, and without much deliberation). Finally, Shiv and Fedorikhin (1999) have also noted that time pressure or increased cognitive load can interfere with an individual's ability to carefully consider the longer-term merits of a choice, e.g., a choice between a healthy vs. a tasty snack (what these authors refer to as a conflict between *heart* and *mind*).

Defaults are thought to be effective in these situations because of such predictable decision-making biases as loss aversion and the endowment effect (Kahneman et al., 1991; Knetsch, 1996). This research has shown that individuals often immediately imbue options with greater value when those options are provided as the default or status quo, even when that option is arbitrarily or randomly provided to an individual. In addition, work on decision-making has consistently shown that when individuals are faced with difficult, complex, or morally fraught decisions (as decisions regarding the environment or environmental sustainability are), they often rely on decision short cuts such as the affect heuristic (their emotional response) or the status quo to avoid making these difficult decisions. These shortcuts may also be taken when there is insufficient time for a careful consideration of all options (Kunreuther et al., 2002; Scheibehenne et al., 2007; Slovic, Finucane, Peters, & MacGregor, 2002).

In short, defaults are thought to be effective in changing decision-making behavior for a number of reasons. As described above, defaults may: (i) provide a low-effort option (acknowledging that individuals will often seek to avoid effortful trade-offs) (Scheibehenne et al., 2007), or (ii) account for the reluctance of individuals to give up the status quo or default option (capitalizing on loss aversion) (Kahneman et al., 1991; Knetsch, 1996). In addition, some have suggested that defaults represent an implied recommendation from important others (Johnson & Goldstein, 2003; McKenzie, Liersch, & Finkelstien, 2006). With this research in mind, it may be efficacious to employ the use of defaults to support and facilitate a variety of pro-environmental behaviors. This is particularly true in situations where issues of habit, time stress, and the disconnect between actions and consequences may severely hinder informational and educational efforts aimed at changing underlying beliefs and behaviors.

Indeed, default behavioral interventions have been successful in a variety of areas, including pro-environmental behavior, healthy eating in fast food restaurants, and in organ donation. Offering green (renewable) energy as the default option for electricity, for example, resulted in a greater number of consumers remaining with the renewable energy option as compared to when grey (non-renewable) energy was offered as the default (Pichert & Katsikopoulos, 2008). When low-calorie food choices were presented as the default option on a menu in a metropolitan sandwich shop, consumers were more likely to choose them than when higher-calorie options were presented (Downs et al., 2009). Likewise, high subscription rates to organ donation programs (over 90% in most cases) in many European countries appears to be related to the fact that

presumed consent is the default condition; in other words, an individual is assumed to be organ donor unless he or she specifies otherwise (Johnson & Goldstein, 2003). Finally, dramatic increases in retirement plan enrolment and savings have been seen for employees where their employer offers automatic enrolment into 401(k) and similar retirement plans (Madrian & Shea, 2001; Thaler & Benartzi, 2004).

However, this research on default behavioral interventions has raised some important questions. For example, in a naturalistic setting, how well do these behavioral interventions perform when compared to straightforward information provision? Related, do defaults coupled with information provision outperform either approach applied on its own? In addition, will the relative appeal of the default option affect its ability to influence choice? The bulk of past research on these behavioral interventions has focused on defaults that are either easy to choose because of their obvious appeal—e.g., in the case of "healthy" fast food—or because they are clearly the "right thing" to do as in the case of organ donation or setting aside money for retirement. But what if implied default options are unappealing? Is offering unappealing defaults sufficient to motivate people to reject the status quo and make the effort to seek out other options?

3. Study Rationale and Research Questions

In light of the serious negative environmental implications of a variety of individual behaviors – including food consumption (what and how much we eat) – it is of vital importance to identify ways to encourage more environmentally responsible choices.

The literature to date suggests that neither solely relying on such strategies as information provision and education campaigns, nor on the intrinsic motivation of individual value orientations is an effective strategy for motivating pro-environmental behaviors. Instead, efforts to design the decision-making environment to make pro-environmental choices more convenient, i.e., the default choice, may be one way to bridge the disconnect between pro-environmental attitudes and behavior. Thus this study was designed to compare the effect of a default behavioral intervention, information provision, and an individual's value orientation in encouraging pro-environmental behavior, and in particular on the choice of more environmentally-friendly food options (in this case, meat-free or vegetarian food options). The research questions are as follows:

1a. Will the provision of vegetarian menu options as a default (more convenient) choice result in a larger proportion of vegetarian meal selections than either (i) the provision of information, or (ii) an individual's pro-environmental value orientation?

1b. Will the effectiveness of this default intervention be decreased by offering unappealing default menu options?

2. Will the provision of information result in a larger proportion of vegetarian meal selections than when information is not presented?

3. Will individuals with a pro-environmental value orientation be more likely to make a meat-free menu choice, regardless of whether these options are offered as the default?

4. Will an individual's gender make her or him more (or less) likely to make a meat-free menu choice, regardless of whether these options are offered as the default?

4. Methods

To address these questions, an experiment was designed to test the effectiveness of a default behavioral intervention, information provision, and individual social psychological and demographic factors (as measured in an accompanying survey) in motivating environmentally responsible food choices (in this case, choice of a vegetarian or 'meat-free' meal).

4.1. Pilot study: Evaluation of the default food options

In order to compare the efficacy of default interventions when the default options are appealing or unappealing, two versions of the experimental menus were used: (i) menus with positively evaluated meat-free menu options and (ii) menus with negatively evaluated menu options.

To establish the relative appeal of these meat-free default food options, I conducted an evaluation of the 22 most commonly offered vegetarian and vegan menu items offered in campus dining halls. A random sample (n = 250) of all undergraduate students possessing campus meal plans was invited to participate in this pilot study, and 26 students (~10%) responded to the invitation.

Pilot study participants were provided a booklet containing a written description of 22 commonly offered vegetarian and vegan meals (randomly arranged). Please see Appendix A for a sample of pages from this booklet. Participants were then instructed to evaluate the affective appeal of all 22 of these meat-free food options using a series of 7-point semantic differential scales ranging from -3 to + 3, with negative scores indicating a negative evaluation and positive scores representing a positive evaluation (0 was neutral). These word pairs, intended to mainly capture participants' instantaneous attractive or aversive response to the menu offerings, were as follows: *repelled* vs. *attracted*, *annoyed* vs. *pleased*, *boring* vs. *exciting*, and *desirable* vs. *undesirable*. A final word pair asked participants to indicate how likely or unlikely it would be for them to choose such a meal. Students participating in the pilot study were asked to read the descriptions and instructions carefully, but to base their answers only on their initial reaction to the meal descriptions. Once finished, students were thanked and provided with a $20 payment for their participation.

Means scores and standard deviations were calculated for each meal option. The five menu options that received the highest semantic differential scores – reflecting a positive evaluation by pilot study participants – were used in the first version of the experiment (referred to from here on in as the *positively evaluated* menu options). These positively evaluated menu options received a mean score of +1.4 out of a scale ranging from -3 to +3 (sd = 0.13). The five most negatively evaluated menu options, which received a mean score of -0.4 out of a scale ranging from -3 to +3 (sd = 0.15),

were used in the second version of the experiment (referred to from here on in as the *negatively evaluated* menu options).

4.2 Experimental design

A 2 x 2 x 2 between subjects factorial design was used for the experiment, varying: (1) the presentation of meat-free menu items as the default option (or not), (2) the provision of information about these same menu options (or not) and (3) the attractiveness of the meat-free options (Figure 5).

Figure 5: Factorial design for food choice experiment. Two versions of each experimental menu was used: one containing only positively evaluated meat-free choices, and one containing only negatively evaluated meat-free choices.

		Information Provision	
		No	Yes
Presence of Default	Yes	*Default Treatment*	*Default + Information Treatment*
	No	*Control*	*Information Treatment*

Specifically, in the Default Treatment, students were presented with a menu that offered *only* meat-free food choices. In the Information Treatment, the meat-free menu options were presented alongside popular non-vegetarian meal options, but were differentiated by a stylized green leaf symbol (ℵ) that also directed the menu reader to the following statements at the bottom of the menu (for interpretation of the references to color here, the reader is referred to the electronic version of this dissertation):

ℵ This symbol on the menu identifies a meat-free meal option.

Recent scientific studies have suggested that consuming less meat can help to reduce our environmental impact

A third experimental menu presented meat-free menu options as the default, but also highlighted these options with this same symbol and pro-environmental information statement (referred to as the Default + Information Treatment). In the Control, meat-free menu options were neither presented as the default, nor differentiated with information.

All study participants who received a default menu (with information or without) were also instructed (verbally, and in text on the menu) to consult an additional menu (posted approximately 12 feet away) if they wished to select from additional food options. This posted menu offered an array of popular non-vegetarian dining hall dishes, and this configuration was designed to approximate what is encountered in the set-up of a typical campus dining-hall.

Finally, two versions of each of these four menu treatments (Default, Default + Information, Information, and Control) were used; one version used only positively evaluated meat-free menu options as the default, while the other used only negatively evaluated meat-free options as the default. The non-vegetarian meal options (found on both the Information and Control menus) were the same for both versions, as was the posted menu. For examples of these eight different menu treatments, please see Appendix B.

4.3 Sampling and experimental protocol

Campus dining halls across MSU's campus were visited quasi-randomly; students were intercepted as they arrived for lunch or dinner and were invited to take part in this experiment under the pretense of completing a survey on their food choices[23]. All undergraduate students living on-campus and with a meal plan were targeted for this study, as they are the primary clientele for MSU culinary services.

Prior to completing this survey, study participants were asked to make a food selection from a randomly assigned menu treatment (as described above). Students were instructed to read the menu carefully and, although no actual food was to be provided, they were asked to make a choice as if they would be receiving their selected menu item for lunch or dinner. As described above, those participants provided with one of the default menus were given additional instructions to consult the posted menu if they desired additional choices. Once they had made their choice, students' menus were collected, their food choices were recorded, and they were instructed to complete the survey. Once the survey was finished, students were thanked, debriefed, and provided with $20 for their participation.

4.4 Survey

To address the research questions about pro-environmental values and gender, all study participants received the same survey, regardless of which experimental

[23] This protocol was reviewed and approved by MSU's Institutional Review Board, and the appropriate procedures for acquiring informed consent were followed.

treatment they were assigned to. The survey consisted of a number of questions that captured basic demographics, meat consumption habits, pro-environmental worldview (New Ecological Paradigm Index), and value orientation (Schwartz Value Survey). This survey, which took approximately 15 minutes to complete, was pilot tested prior to commencing the experiment[24].

Meat consumption habits

Students were asked to indicate their consumption habits in terms of self-identifying as a: (i) meat consumer, (ii) meat consumer (only chicken or fish), (iii) vegetarian, or (iv) vegan. A follow-up question asked how often, over the past week, they had consumed meat: (i) 0 times, (ii) 1-2 times, (iii) 3-5 times, or (iv) at least 7 times.

Value orientation

Students also completed a modified Schwartz Value Survey (Schwartz, 1996), with items added to reflect the Biospheric orientation (de Groot & Steg, 2008; Stern et al., 1998). This survey has been used extensively in studies of pro-environmental behavior, and in particular the Biospheric and Altruistic value orientations (collectively referred to as the 'Universalistic' value orientation') have been identified as motivating behaviors that benefit the environment, e.g. adopting a vegetarian diet (Kalof et al., 1999), sustainable food consumption (Vermeir & Verbeke, 2008), and general environmental concern (Hansla et al., 2008; Stern et al., 1995).

[24] Twenty undergraduate (freshmen) volunteers were recruited in the Holmes student residence building for an initial test of the survey instrument. Edits were made to the survey based on their comments.

In keeping with the suggested protocol for administering the Schwartz Value Survey, the following items were presented (in random order) and students were instructed to evaluate them on a seven-point Likert scale (ranging from 1 – *Not important to me* to 7 – *Extremely important to me*): Authority, Tradition, Equality, Self-direction, Respecting the Earth, Security, Conformity, Unity with Nature, Influence, A World at Peace, Protecting the Environment, Stimulation, Wealth, Variety, and Social Justice. As with other studies, each value was accompanied by a brief description. Please see Appendix C for the modified Schwartz Value Survey. Specifically, the Universalistic Value Orientation score was calculated as an average of the individual scores for 'Respecting the earth', 'Protecting the environment', 'Unity with nature', 'Equality, 'Social Justice', and 'A World at Peace'. Higher scores reflect a more pro-environmental value orientation.

Pro-environmental beliefs

The fifteen-statement New Ecological Paradigm (NEP) Scale (Dunlap et al., 2000) was used to capture pro-environmental beliefs (also in Appendix C). This scale was developed to capture a shift in the way that humans view the natural world, *from* one of anthropocentrism and domination (known as the Dominant Social Paradigm, or DSP) *to* an acknowledgment of the limits to growth imposed by the natural world (as well as our negative impact on these natural processes). While the NEP Scale does not measure values directly, the scale does tap into a set of beliefs that are associated with Universalistic and Biospheric value orientations (Stern et al., 1999).

Specifically, students rated each of fifteen NEP Scale statements on a 5-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*), with 3 being *Unsure*. Even numbered questions were reverse scored prior to calculating an average score for each individual. A high NEP score is thought to reflect pro-environmental beliefs or worldview and, as with Biospheric and Universalistic value orientations, has been associated with a variety of environmentally significant behaviors, e.g., support for climate change policy (Dietz, Dan, & Shwom, 2007) and participation in a green electricity program (Clark et al., 2003).

Demographics

Students were asked to indicate their gender, as well as their race/ethnicity, place of residence outside of the university (urban, suburban, or rural), year or level at the university, and degree program and specialization (if known). Although only gender was used in the analysis, the remaining demographic information was gathered in order to compile a profile of study participants.

4.5 Analysis

Data from the experiment was analyzed using binary logistic regression, with the experimental variables (Default, Information, and Meal Evaluation) and covariates from the survey (NEP score, Universalistic Score, and Gender) examined as predictors of choice of a meat-free menu item. Further descriptions are below, but please see Table 6 (below) for a summary of these variables.

The dependent variable was a binary response variable, coded as 0 when a meat-free meal was not chosen, and 1 when a meat-free meal was chosen. The experimental variables were binary categorical variables, coded as either present (1) or absent (-1)[25]. This coding was used (as opposed to 0 for absent and 1 for present) to allow for the creation of interaction terms that were uncorrelated with the main effects (Norusis, 2006). Assigning the category of '1' to these variables when they were present allowed for a more intuitive interpretation of the results. In other words, the presence of these variables was assumed to *increase* the likelihood of choosing a meat-free menu item.

The NEP and Universalistic Value Orientation scores were included as continuous variables, with higher numbers indicating a more pro-environmental worldview and value orientation respectively. Prior to inclusion in the regression analysis, the reliability of these multi-item measures was tested using Cronbach's alpha.

[25] Or 1 for positively evaluated menu items, and -1 for negatively evaluated menu items.

Table 6: Summary of regression variables

Variable	Description
Experimental	
Default	Only meat-free meal options presented on the menu. Coded as 1 for yes, 0 for no.
Information	Meat-free meal options differentiated from other menu options by a symbol and brief pro-environmental message. Coded as 1 for yes, -1 for no.
Evaluation	Meat free meal options evaluated as either appealing (positively evaluated) or unappealing (negatively evaluated). Coded as 1 for positively evaluated, and -1 for negatively evaluated.
Survey	
New Ecological Paradigm (NEP) Index	Calculated as the average of an individual's scores for each of the 15 NEP Scale items (responses for even-numbered items were reverse-scored prior to calculating an average).
Universalistic Value Orientation Score	Calculated as an average of an individual's scores for 'Respecting the earth', 'Protecting the environment', 'Unity with nature', 'Equality, 'Social Justice', and 'A World at Peace'.
Gender	Females were coded as 0 and males were coded as 1.

5. Results

5.1 Study population

A total of 320 students participated this experiment, with an equal number (40) of students randomly allocated to each of the 8 experimental treatments (Default: yes/no,

Information: yes/no, and Meal Evaluation: Positive and Negative). Of these, one participant was dropped (from the default/positively evaluated menu choices treatment) due to not following instructions, for a total of 319 participants.

The demographic profile of student participants was similar to that found for the undergraduate population as a whole at the time of the experiment (see Table 7 below). Of those participants who reported their gender, 52.7% were female, and 46.4% were male, with three individuals (0.94%) not reporting their gender. The majority of participants were Caucasian (73.7%), followed by African Americans (13.5%), and Chicano/Hispanic/Latino (3.1%); although not all participants reported their race/ethnicity (1.6%). Note also that African-Americans were over-represented in this sample, and international students were under-represented. Most student participants came from either urban or suburban households (25.6 and 58.6% respectively), and were either freshmen or sophomores at the time of the study (42% and 32% of participants respectively).

Table 7: Demographic profile of study participants and Michigan State University undergraduate population.

	Study Participants: Number/*Percent of Total (n = 319)**	**MSU Undergraduate Population: Percent of Total (Spring 2010)**
Gender		
Female	168/*52.7%*	*53.5%*
Male	148/*46.4*	*46.5*
Did not report	3/*0.94*	*na*

Table 7: (cont'd)

Race/Ethnicity		
American Indian	4/*1.3%*	*0.7%*
Asian/Pacific Islander	16/*5.0*	*5.1*
Black/African American	43/*13.5*	*7.2*
Caucasian	235/*73.7*	*71.6*
Chicano/Hispanic/Latino	10/*3.1*	*2.8*
International	6/*1.9*	*10.5*
Did not report	5/*1.6*	*na*
Year/Level		
Freshmen	134/*42.0%*	*46.9%*
Sophomore	102/*32.0*	*29.4*
Junior	47/*14.7*	*12.6*
Senior	33/*10.3*	*11.1*
Did not report	3*/0.94*	*na*
Place of residence (outside of school)		
Rural	50/*15.7%*	*na*
Urban	82/*25.6*	
Suburban	187/*58.6*	
Did not report	0/*0*	

- Percents do not add to 100 due to rounding.

In terms of self-reported meat consumption habits (see Table 8 below), most students categorized themselves as meat consumers (84%), with very few self-identifying as either vegetarian (2.8%) or vegan (0.3%). Of note, only female students reported being vegan or vegetarian. In the remaining categories, fewer females 130 (or 77.4%) referred to themselves as meat consumers than males (135 or 91.2%), however over twice as many females as males stated that they – as meat consumers – ate only chicken or fish (16.7% of females vs. 8.8% of males).

A majority of students ate meat at least 3-5 times per week (86.5% in total), and of the small number of students reporting less frequent meat consumption, over twice as many of these students reported eating meat 1-2 times over the last week (9.4%) as compared to those reporting no meat consumption (4.1%) in the same time period. Females were much more likely to place themselves in the categories representing less frequent weekly meat consumption, with the majority of females (45.2%) indicating that they ate meat 3-5 times per week. Most males, on the other hand, (75.7%) indicated that they had eaten meat at least once per day over the past week.

Table 8: Self-reported meat consumption habits

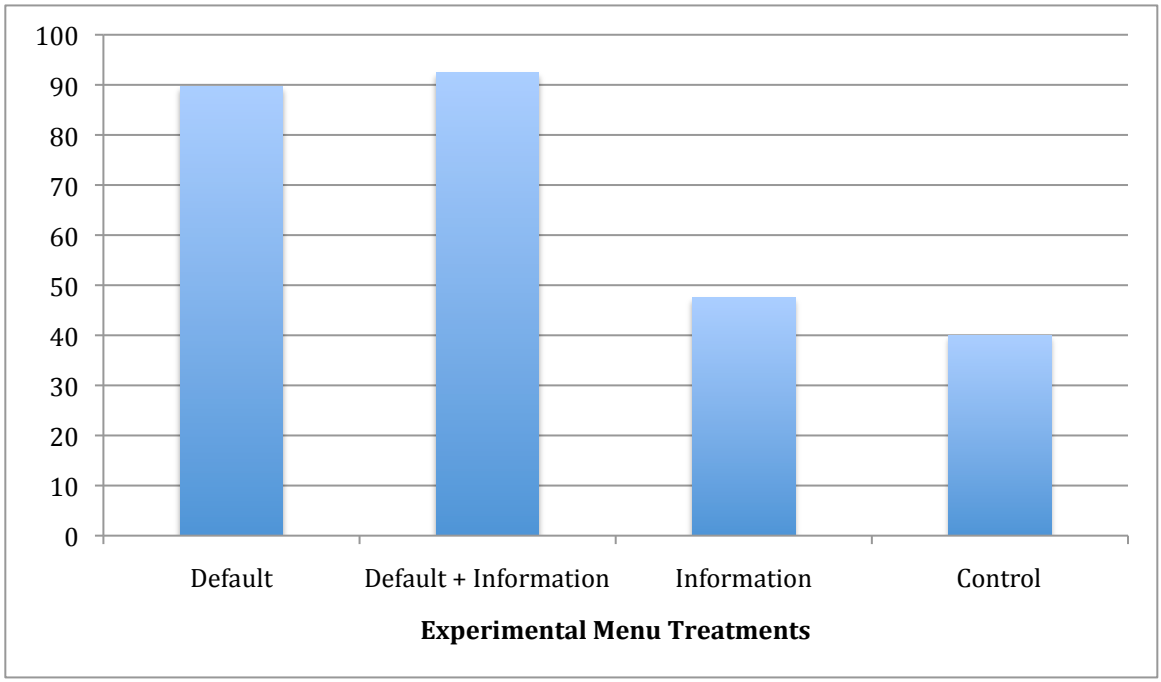
	Number/*percent of n*		
I would describe myself as a:	**Study participant total n = 319**	**Females n = 168**	**Males n= 148**
Vegan	1/*0.3%*	1/*0.6%*	0/*0%*
Vegetarian	9/*2.8*	9/*5.4*	0/*0*
Meat consumer (only chicken/fish)	41/*12.9*	28/*16.7*	13/*8.8*
Meat consumer	268/*84*	130/*77.4*	135/*91.2*
I have consumed meat over the past week:			
0 times	13/*4.1%*	12/*17.7%*	1/*0.7%*
1-2 times	30/*9.4*	24/*14.3*	6/*4.1*
3-5 times	105/*32.9*	76/*45.2*	29/*19.6*
At least once a day	171/*53.6*	56/*33.3*	112/*75.7*

Note: Values for Gender will not sum to Study Participant Total because not all participants reported their gender. Percents do not add to 100 due to rounding.

5.2 Summary of experimental and survey variables

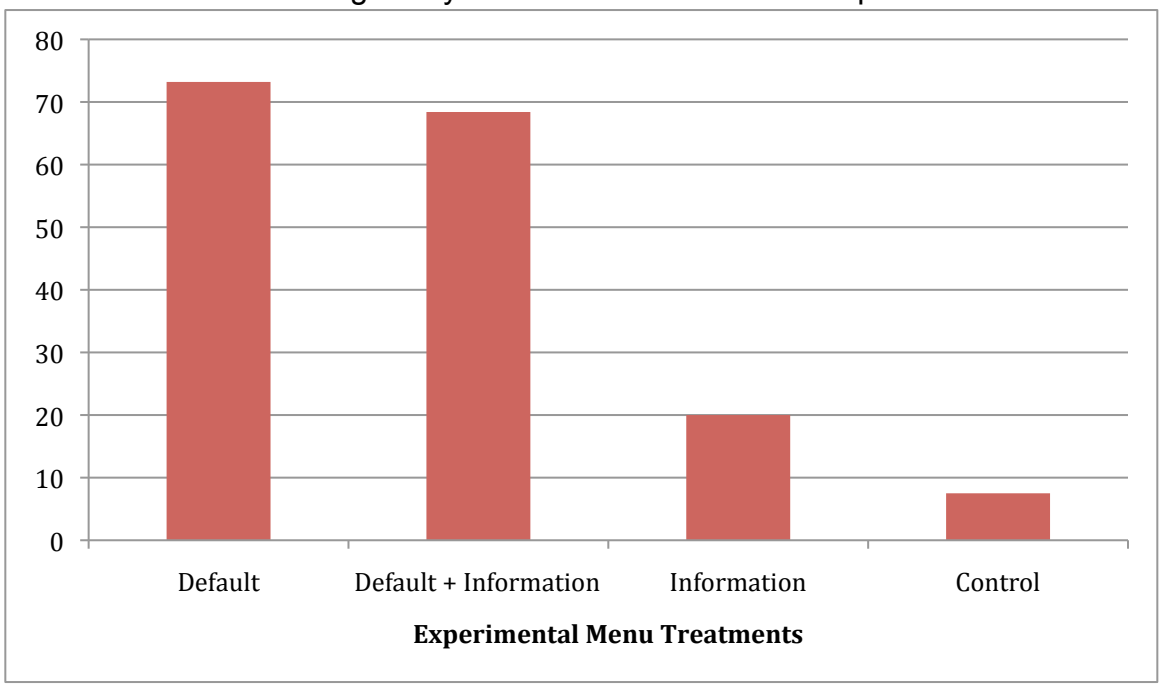
Figure 6 illustrates the effect of the experimental variables on menu choice. For the positively evaluated meat-free menu choices, 89.7% of students receiving the Default menu treatment chose a vegetarian meal, while a larger proportion (92.5%) of those receiving the Default + Information menu treatment made that same meat-free choice. For the Information and Control treatments (again with positively evaluated meat-free menu options), only 47.5% and 40% of students respectively chose a vegetarian meal.

Figure 6: Percent of study participants who chose a meat-free meal; experimental menu treatments with positively evaluated meat-free meal options.



A similar pattern was observed for the negatively evaluated meat-free menu choices (Figure 7); 73.2% chose a vegetarian meal from Default menu; while of those provided with a 'Default + Information' menu, a smaller proportion (68.4%) chose vegetarian. A much smaller proportion of students receiving either the Information menu (20%) or the Control menu (7.5%) chose a vegetarian meal from among the negatively evaluated meat-free menu options.

Figure 7: Percent of study participants who chose a meat-free meal; experimental menu treatments with negatively evaluated meat-free meal options.



The overall NEP score was 3.5 out of a possible 5 (with a range of 1.6 to 4.8), and is similar to what has been found in other studies (Clark et al., 2003). Similar results were found for the Universalistic score, where the overall average was 4.8 (out of 7), with a range of 1.0 to 7.0 (see Table 9 below). Both the NEP and Universalistic scores had

acceptable reliability (α = 0.791 and 0.786, respectively) for inclusion in the logistic regression analysis.

Table 9: Mean scores and proportions for social psychological survey variables used in logistic regression.

Variable	Average Score (n = 319)
NEP Scale†	3.50 (0.55)
Universalistic Value Orientation*	4.8 (1.10)

Notes: Standard deviation given in parentheses.
†Cronbach's alpha = 0.792 (15 items)
*Cronbach's alpha = 0.786 (6 items)

Finally, as has already reported, 52.5% of study participants were female, and 46.3% were male, and, overall, females were more likely to choose a meat-free meal option than males. In other words 58.3% of females and 48.9% of males – regardless of which experimental treatment they were randomly place in – chose a meat-free meal.

5.3 Logistic regression analysis

A logistic regression model was used to analyze study participants' choice of a meat-free meal option (or not). The experimental variables (default, attractiveness of meat-free options, and information), two and three-way interactions of these individual experimental variables, as well as covariates from the survey (NEP score, Biospheric score, and Gender) were entered into the model in blocks in order to monitor changes in the -2 log likelihood (-2 LL) values and Nagelkerke R^2. A decrease in the -2LL value between successive block entries reflects an improvement in model fit, with the Block χ^2

statistic testing the null hypothesis that all coefficients in the most recent block entry are zero. An increase in the Nagelkerke R^2 is also reflective of an improvement in model fit[26]. Finally, the contribution of individual variables to the improved model fit be tested using the Wald statistic, which tests the null hypothesis that a particular coefficient in the model equals zero (Agresti & Finlay, 1997; Norusis, 2006).

The complete model (see Model 4, Table 10 below) performed well (χ^2 = 131.296, df = 10, $p < 0.001$), with a Nagelkerke R^2 of 0.457. Controlling for all other variables, the default menu configuration was a significant predictor of choice (Wald = 74.581, df = 1, $p < 0.001$), and increased the odds of choosing a vegetarian meal by a factor of 4.3 when compared to non-default menu (please see Table 11 below for calculation of odds from the logistic regression coefficients[27]). The evaluation of the menu items was also a significant predictor of choice (Wald = 20.369, df = 1, $p < 0.001$), with the provision of positively evaluated vegetarian items increasing the odds of choosing a meat-free meal by a factor of 2.1, when controlling for other predictors. These effects remained significant even with the addition of interaction terms and survey variables to the model.

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[26] Norusis (2006) cautions against reporting pseudo-R^2 values, e.g., Nagelkerke R^2, as they cannot be interpreted in the same way as standard OLS R^2 values. However, Hosmer and Lemeshow (Hosmer & Lemeshow, 2000) have suggested that pseudo-R^2 values are useful in comparing models (from the same data set) in the model building stage.

[27] In logistic regression, each coefficient (B) represents the change in the *log odds* that occurs when the corresponding independent variable increases by one unit or, for most variables in this model, changes from -1 to 1 (and controlling for all other independent variables). The odds ratio (e^B) represents the factor by which the odds change when the corresponding independent variable increases by one unit (or changes from -1 to 1), again controlling for all other variables (Norusis 2006).

Although the presence of information on the menu did appear to increase the proportion of meat-free menu items chosen, i.e., when comparing between the default and default + information treatments or between the information and control treatments – particularly for the positively evaluated menu versions (see Figures 3 and 4), this variable was not a significant predictor of choice (Wald = 0.929, df = 1, p = 0.335). Similarly, none of the two- or three-way interaction terms were a significant addition to the model (Block χ^2 = 0.822, df = 3, p = 0.844; Block χ^2 = 1.371, df = 1, p = 0.242, respectively).

In terms of the addition of survey variables to the model, the Block χ^2 statistic from Model 4 (χ^2 = 8.47, df = 3, p< 0.05) allowed us to reject the null hypothesis that all survey variable coefficients were zero. However, neither an individual's NEP score nor their Universalistic score significantly contributed to predicting the dependent variable (Wald = 1.542, df = 1, p = 0.214, Wald = 0.070, df = 1, p =0.791 respectively). Only Gender was a significant additional predictor of choice, with male students 0.5 times *less* likely to choose a meat-free menu item as compared to female students (Wald = 4.773, df = 1, p = 0.029). Thus, the decrease in the -2 log-likelihood score (from 312.507 to 301.845) and increase in the Nagelkerke R^2 (from 0.426 to 0.457) between Model 1 and Model 4 is due only to the addition of Gender to the model.

Table 10: Logistic regression results of choice of meat-free menu options, showing values for regression coefficients (B) and standard errors (in parentheses).

Covariates	Model 1: Main effects	Model 2: Two-way interactions	Model 3: Three-way interaction	Model 4: Complete model (including covariates from survey)
Constant	0.254 (0.141)	0.247 (0.154)	0.230 (0.159)	-0.491 (1.021)
Main effects				
Default[28]	1.339 (0.153)***	1.349 (0.155)***	1.367 (0.159)***	1.460 (0.169)***
Information[29]	0.108 (0.140)	0.092 (0.142)	0.169 (0.159)	0.155 (0.161)
Evaluation[30]	0.733 (0.151)***	0.744 (0.155)***	0.764 (0.159)***	0.725 (0.161)***
Two-way interaction terms				
Default * Information		-0.136 (0.155)	-0.124 (0.159)	-0.116 (0.161)
Information * Evaluation		-0.080 (0.154)	-0.058 (0.159)	-0.079 (0.162)
Default * Evaluation		-0.002 (0.154)	-0.020 (0.159)	-0.039 (0.161)
Three-way interaction terms				
Default * Information * Evaluation			0.184 (0.159)	0.162 (0.161)

[28] Coded as -1 = no default menu offerings, 1 = default menu offerings

[29] Coded as -1 = no information provided, 1 = information provided

[30] Coded as -1 = negatively evaluated default menu offerings, 1 = positively evaluated default menu offerings

Table 10: (cont'd)

Covariates from survey NEP Scale[31] Universalistic Value Orientation Gender				0.350 (0.282) -0.037 (0.140) -0.685 (0.313)*
N	314	314	314	314
Model χ^2, df	120.634, 3	121.455, 6	122.827, 7	131.296, 10
-2 Log Likelihood	312.507	311.686	310.314	301.845
Block χ^2, df	120.634***, 3	0.822, 3	1.371, 1	8.470*, 3
Nagelkerke R^2	0.426	0.429	0.433	0.457

Note: The effect of a predictor is significant at *p < 0.05, ***p <0.001.

[31] The NEP Scale and Universalistic Value Orientation Scale are correlated (r = 0.360, p < 0.01), but are included together in the same model for illustrative purposes. When this logistic regression model is run with each scale separately, the results do not change.

Table 11: Calculation of the Odds Ratio (OR) and 95% Confidence Interval of the OR for the logistic regression analysis of choice of meat-free menu item.

Covariate	**B: *log of Odds Ratio* (Std. error)**	**e^B: *Odds Ratio* (95% CI)**
Constant	-0.491 (1.021)	0.612 (0.083, 4.527)
Main effects		
Default	1.460*** (0.169)	4.305 (3.092, 5.997)
Information	0.155 (0.161)	1.167 (0.852, 1.601)
Evaluation	0.725*** (0.161)	2.065 (1.506, 2.831)
Two-way interaction terms		
Default * Information	-0.116 (0.161)	0.890 (0.649, 1.221)
Information * Evaluation	-0.079 (0.162)	0.924 (0.673, 1.269)
Default * Evaluation	-0.039 (0.161)	0.961 (0.701, 1.319)
Three-way interaction term		
Default * Information * Evaluation	0.162 (0.161)	1.176 (0.858, 1.612)
Covariates from survey		
NEP Scale	0.350 (0.282)	1.420 (0.817, 2.466)
Universalistic Value Orientation	-0.037 (0.140)	0.964 (0.732, 1.268)
Gender	-0.685* (0.313)	0.504 (0.273, 0.931)

The effect of a predictor is significant at *p < 0.05, ***p <0.001.
Note: the odds ratio is calculated by exponentiating 'B' (regression coefficient, or log of Odds Ratio). The 95% CI for the Odds Ratio is calculated by first finding the 95% CI of the logistic regression coefficient (calculated as B $\pm$ 1.96 * se) and then exponentiating the values for the upper and lower limits of the OR CI.

It was suggested that the lack of an association between either an individual's NEP or their Universalistic Value Orientation score and their choice of a vegetarian meal option (or not) may be due to the fact that these variables may not have a *direct* effect on an individual food choices. This hypothesis was tested with a post-hoc regression analysis

of the effect of these variables on self-reported vegetarianism (from the survey); in this case all individuals who indicated they were vegetarian or vegan were coded as '1', all other students were coded at '0'. Only the NEP score was a significant predictor of self-reported vegetarianism (Model χ^2 = 10.837, df = 2, p = 0.004; Wald = 4.216, p = 0.04). As would be expected, when self-reported vegetarianism was then included in the complete model in lieu of NEP or Universalistic scores, self-reported vegetarianism was a significant predictor of meat-free choice, (Model χ^2 = 142.499, df = 9, p < 0.001; Wald = 8.274, p = 0.004), increasing the odds of choosing a vegetarian meal by a factor of 28.7).

An additional post-hoc logistic regression analysis was conducted, but this time using self-reported weekly meat consumption habits (instead of self-reported vegetarianism or veganism). Self-reported meat consumption habits was coded as a dummy ordinal variable, with 0 times per week coded as '0', 1-2 times per week coded as '1.5', 3-5 times per week coded as '4' and 7 or more times per week coded as '7'. When self-reported meat consumption habits was then included in the complete model in lieu of NEP or Universalistic scores, they too were a significant predictor of choice of a meat-free menu item, (Model χ^2 = 142.636, df = 9, p < 0.001; Wald = 12.339, p < 0.001), *decreasing* the odds of choosing a vegetarian meal by a factor of 0.768). Interestingly, with this variable added to the model, Gender was no longer a significant predictor of choice of a meat-free menu item.

6. Discussion

The default menu configuration had a powerful influence on the choice of a meat-free menu option (Research Question 1a). Those individuals who were assigned a default menu (both with information and without) were significantly more likely to choose a meat-free menu item than those who did not receive a default menu. These results are also in keeping with what has been found in other studies (Downs et al., 2009; Johnson & Goldstein, 2003; Pichert & Katsikopoulos, 2008), and support the assertion that defaults (and other types of behavioral interventions) can be an important tool in motivating behavior change in settings with both individual and societal benefits, e.g., supporting healthy lifestyles or encouraging pro-environmental behavior. One common thread among these different scenarios is that defaults may counter the propensity to choose an item or a course of action with short-term benefits (even if that simply means the avoidance of difficult, emotionally fraught, or time-consuming decisions) but which are far outweighed by longer-term consequences for quality of life or for society as a whole.

Previous research suggests that defaults can motivate behavior via a number of mechanisms. Johnson and Goldstein (2003) and Pitchert and Katsikopoulos (2008) suggest that defaults may work because the represent an implied recommendation from those presenting the options, and for this reason alone may be viewed more favorably than the non-default options. As such, the default menu choices in this experiment may have been seen as a suggested meal option from campus culinary services, perhaps further reinforced by the informational message on some of the default menus. On the

other hand, Downs et al. (2009) note that the people may remain with the default option because of loss aversion and status quo bias. Study participants most likely were hungry and/or under time pressure, and the options in front of them – absent any point of comparison as to how good or bad they were – may simply have provide a quick and convenient choice and one that required minimal physical or mental effort on their part. Thus, future research should aim to identify the underlying mechanism of defaults, and in particular determine which mechanisms are at work in these different contexts.

This study has also shown that – as would be expected -- the affect-based evaluation of the default menu items can also have a significant influence on food choice; with negatively evaluated food items being selected less often than positively evaluated items. However, there was no statistically significant interaction between the default and the affective evaluation treatment; the efficacy of the default menu configuration in motivating meat-free meal choices did not appear to be inhibited (or enhanced) by the affective appeal of those items (Research Question 1b). However, the study design can be criticized for (i) not providing actual food choices and thus lacking any consequences for a less than optimal choice, or (ii) for focusing only on a single menu choice event, where the negatively evaluated food options might have had an influence on the success of the default menu configuration in subsequent food choice situations.

In contrast, the provision of information on the menus did not have a significant influence on the choice of a meat-free menu item (Research Question 2). Although information may be helpful in motivating behavior change over a longer time scale, e.g.,

in helping to make connections between values and behaviors, or in conveying evolving societal norms (Stern & Dietz, 1994; Vermeir & Verbeke, 2006), it appears to be less effective at supporting change at the scale of individual choice. As research has shown, what we know about the healthiness, sustainability, or financial soundness of a particular choice can be overwhelmed by the immediate characteristics of the decision environment, where immediate or visceral factors dominate and/or when time pressure prevents thoughtful deliberation (Ariely & Loewenstein, 2006; Milkman et al., 2008a; Shiv & Fedorikhin, 1999). Nonetheless, the provision of information was associated with an increase – albeit not statistically significant – in the proportion of meat-free menu choices when comparing the control and information treatments (or, less consistently, between the default and default + information treatments). As other authors have suggested, a small proportion of individuals may have responded to the information via activation of pro-environmental norms or through establishing a connection between their values the environmental consequences of this behavior (Biel et al., 2005; de Boer et al., 2007; Grankvist & Biel, 2001).

Finally, the information treatment may have been insufficiently detailed to motivate behavior change; the connection between meat-free meal choices and 'positive contributions to environmental health and sustainability' may have benefitted from a reference to specific examples of environmental benefits, or via a reference to behavioral norms around this issue, e.g., "many university students who have an interest in environmental issues like habitat loss and climate change are making the decision to eat less meat." Reference to descriptive and prescriptive social norms has

been successful in motivating a number of health-related and pro-environmental behaviors (Gockeritz et al., 2010; Goldstein, Cialdini, & Griskevicus, 2008). It would be interesting to repeat this study, but instead use a norms-based informational intervention in comparison with the default intervention.

Many authors have noted both direct and indirect connections between pro-environmental values or worldview and a variety of pro-environmental behaviors, including vegetarianism (Clark et al., 2003; de Groot & Steg, 2008; Dietz et al., 1995; Nordlund & Garvill, 2002; Verplanken & Holland, 2002). However, this relationship was not observed in this present study (Research Question 3). Neither an individual's NEP score nor their Universalistic score[32] were associated with the selection of a meat-free menu choice. However, this could be due to a number of factors. First, many students have yet to make a connection between their food consumption habits and negative environmental consequences (as reported in Chapter 3). If students do not associate meat consumption (or food miles, or high fat and highly processed foods, etc.) with such issues as habitat loss, air, water, and soil pollution, or climate change, then the possession of pro-environmental values or worldview may simply not come into play with these decisions. Second, it may be difficult to establish a direct connection between values or worldview and individual decisions (Stern, 1999). In the same way

[32] As previously mentioned, other studies have found it difficult to differentiate the Biospheric value orientation from the Altruistic value orientation (Garling et al., 2003; Hansla et al., 2008; Stern et al., 1999). When the logistic regression analysis was run using only a student's 'Biospheric' scores (combining the 3 items: *Protecting the Environment, Unity with Nature, and Respecting the Earth*, Cronbach's alpha = 0.831), the regression results did not change.

that information may be overwhelmed by situational factors (as described above), more abstract motivations such as a envirocentric worldview or a Universalistic value orientation may only have a weak (or no) influence in a decision dominated by hunger, time pressure, or force of habit.

Instead, values and worldview may have a more indirect role in motivating behavior change and decision-making. Support for this hypothesis comes form the fact that an individual's NEP score was an important predictor of self-reported vegetarianism, which in turn had a significant influence on the probability that that same individual chose a meat-free menu option in the experiment. This potential causal relationship warrants further investigation with more dedicated sampling to recruit a sufficient number of vegetarians and vegans and/or to query weekly meat consumption habits with an open-ended question (to allow for the calculation of a continuous variable).

Finally, Gender has traditionally been associated with the decision to eschew meat, with females more likely to adopt a vegetarian lifestyle than males (Gossard & York, 2003; Janda & Trocchia, 2001; Kalof et al., 1999). This study was no exception; when accounting for all other predictors, male participants were 0.5 times *less* likely than female participants to choose a meat-free meal option (Research Question 4). While females may be more accepting of meat-free meal offerings for a variety of reasons, e.g., health, sensory, ethical, or environmental concerns, (Fox & Ward, 2008; Kubberod, Ueland, Rodbotten, Westad, & Risvik, 2002; Twigg, 1983), this pattern may also be due to the fact that males are more likely to view a meal as *incomplete* if it lacks meat

(qualitative study results), and thus be less willing to accept a meat-free meal option – even if it is the more convenient choice. Adams (2006) also suggests that, for some, meat consumption is inextricably linked with male power, physical strength, and athleticism. Most likely all of these factors played a role in the gender differences observed in this study. Interestingly, when controlling for weekly meat consumption habits, gender was no longer a significant predictor of choice of a meat-free meal in this experiment. As with the potential causal relationship between an individual's NEP score, self-reported vegetarianism, and choice of a meat-free menu item (described above), this relationship warrants further exploration as well.

7. Future Directions and Conclusions

As has already been discussed, one potential criticism of this study is that the students were not allowed to sample the foods they had chosen during the experiment, thus elements of realism and consequences are lacking in this study. An important follow-up study, then, would be to conduct the experiment so that students could both eat and evaluate the menu item they had chosen. This post-decisional evaluation would then offer some insight into how likely it would be that the student would make the same choice when presented with similar default options in the future. Similarly, the efficacy of default interventions could be studied over a longer time frame, with the idea that if individuals are unsatisfied with their default choices then they will be less likely to accept this more convenient option in the future (and thus the efficacy of the default will decline over time) (Downs et al., 2009).

In addition, a recent study has found that acting pro-environmentally in one facet of your life may give you license to act less altruistically in others (Mazar & Zhong, 2010). These authors showed that study participants who had made a purchase within a virtual 'green' store (carrying a majority of environmentally-friendly products) shared less money in an anonymous dictator game than those who had made purchase from a virtual 'conventional' store (carrying only a few environmentally-friendly products). Thus, the use of defaults in the domain of food choice could potentially have negative consequences for decisions that people make in other domains, e.g., energy use or choice of transport. This might be particularly true if the default intervention is seen to be overly coercive or not in alignment with an individual's core beliefs (Goldstein, Johnson, Herrmann, & Heitmann, 2008). In other words, many study participants may feel free to consume a hamburger their next meal after having been provided with a vegetarian option earlier.

Finally, despite the fact that default behavioral interventions do not *remove* options, but instead make options more or less convenient for the decision-maker, there are legitimate concerns about the autonomy and independence of individuals facing such structured decision environments (Smith, Goldstein, & Johnson, 2008). However, research has consistently shown that our choices are heavily influenced by the decision context – whether we are aware of it or not. And, whether we are willing to admit or not, marketers and retailers have been particularly adept at exploiting this phenomenon. Using defaults and other behavioral interventions to advance agreed upon individual and societal goals may go against how we envision we make decisions (deliberate,

thoughtful, and informed), but they instead harness what we know to be common errors and biases (e.g., affect heuristic, status quo bias) in order to make our lives healthier or more environmentally benign. The key is to be transparent in the decision to employ defaults, and to monitor their acceptance (or lack thereof) over time.

Even with these caveats, defaults are a useful tool for motivating behavior change. Relying on information alone may stimulate shifts in values, norms and behaviors over the (very) long term. However, we are facing a host of environmental issues that demand immediate and substantive changes in the way that individuals and society use resources. Links between individual behavior and climate change have been established, both in terms of the greenhouse gas emissions made as a result of the lifestyle of an average North American or European, as well as in terms of the ready improvements that could be made with simple behavioral changes – including the foods we eat. Default interventions and other behavior-based decision-structuring efforts are important tools in motivating such changes now.

APPENDICES

Appendix A

Sample of booklet from meal evaluation pilot study

INSTRUCTIONS

On the following pages you will be asked several questions about how you feel about several different menu items offered in MSU dining halls. Please answer each question using the number scales provided (note that there are opposite word pairs at either end of these scales). See example below.

For example, if you were asked to indicate how you felt about finding a 'Grilled Mediterranean Vegetable Sandwich' on a lunchtime menu, and you found that option exciting, then you would circle a '1' if it was *somewhat exciting*, a '2' if it were *exciting*, or a '3' if it was *very exciting*.

On the other hand, if you found this sandwich to be boring, then you would circle one of the negative numbers. Circling a '-1' indicates that you find the sandwich *somewhat boring*, a '-2' if you find the sandwich *boring*, and a '-3' if you find the sandwich *very boring*.

If you feel neither bored nor excited (neutral) about this sandwich, then circle '0'.

MENU ITEM: Grilled Mediterranean Vegetable Sandwich
Two slices of crusty Italian bread filled with sautéd onion, marinated red pepper, roasted eggplant, sundried tomato, and mozzarella cheese, and then grilled.

For me, a Grilled Mediterranean Vegetable Sandwich on the lunchtime menu would be….

	Very		**Somewhat**		**Somewhat**		**Very**	
Boring	-3	-2	-1	0	1	2	3	**Exciting**

Imagine that you are about to order lunch at your favorite MSU dining hall, and a 'Garden Burger' is on the menu. Please answer the following questions about this item:

MENU ITEM: MorningStar Farms Garden Burger®
A savory vegetable and grain burger served in a hamburger bun, with lettuce and tomato.

If I saw a Garden Burger on the lunchtime menu, I would be….

	Very		Somewhat		Somewhat		Very	
Repelled	-3	-2	-1	0*	1	2	3	**Attracted**
Annoyed	-3	-2	-1	0	1	2	3	**Pleased**

For me, a Garden Burger on the lunchtime menu would be….

	Very		Somewhat		Somewhat		Very	
Boring	-3	-2	-1	0	1	2	3	**Exciting**
Undesirable	-3	-2	-1	0	1	2	3	**Desirable**

How likely is it that you would choose a Garden Burger to eat for lunch?

	Very		Somewhat		Somewhat		Very	
Unlikely	-3	-2	-1	0	1	2	3	**Likely**

*Choose '0' if you are neutral.

Imagine that you are about to order lunch at your favorite MSU dining hall, and 'Cheese Quesadillas' is on the menu. Please answer the following questions about this item:

MENU ITEM: Cheese Quesadillas
A grilled flour tortilla filled with melted sharp cheddar and pepperjack cheese.

If I saw Cheese Quesadillas on the lunchtime menu, I would be….

	Very		**Somewhat**		**Somewhat**		**Very**	
Repelled	-3	-2	-1	0*	1	2	3	**Attracted**
Annoyed	-3	-2	-1	0	1	2	3	**Pleased**

For me, Cheese Quesadillas on the lunchtime menu would be….

	Very		**Somewhat**		**Somewhat**		**Very**	
Boring	-3	-2	-1	0	1	2	3	**Exciting**
Undesirable	-3	-2	-1	0	1	2	3	**Desirable**

How likely is it that you would choose Cheese Quesadillas to eat for lunch?

	Very		**Somewhat**		**Somewhat**		**Very**	
Unlikely	-3	-2	-1	0	1	2	3	**Likely**

*Choose '0' if you are neutral.

Imagine that you are about to order lunch at your favorite MSU dining hall, and a 'Vegetarian Sloppy Joe' is on the menu. Please answer the following questions about this item:

MENU ITEM: Vegetarian Sloppy Joe
MorningStar Farms Veggie Burger Crumbles® in a savory tomato sauce, served on a hamburger bun.

If I saw a Vegetarian Sloppy Joe on the lunchtime menu, I would be….

	Very		**Somewhat**		**Somewhat**		**Very**	
Repelled	-3	-2	-1	0*	1	2	3	**Attracted**
Annoyed	-3	-2	-1	0	1	2	3	**Pleased**

For me, a Vegetarian Sloppy Joe on the lunchtime menu would be….

	Very		**Somewhat**		**Somewhat**		**Very**	
Boring	-3	-2	-1	0	1	2	3	**Exciting**
Undesirable	-3	-2	-1	0	1	2	3	**Desirable**

How likely is it that you would choose a Vegetarian Sloppy Joe to eat for lunch?

	Very		**Somewhat**		**Somewhat**		**Very**	
Unlikely	-3	-2	-1	0	1	2	3	**Likely**

*Choose '0' if you are neutral.

Imagine that you are about to order lunch at your favorite MSU dining hall, and a 'Vegan Quesadilla' is on the menu. Please answer the following questions about this item:

MENU ITEM: Vegan Quesadilla
Grilled flour tortilla filled with brown rice, refried beans, black beans, tomato salsa, garlic, and jalapeno peppers.

If I saw a Vegan Quesadilla on the lunchtime menu, I would be….

	Very		Somewhat		Somewhat		Very	
Repelled	-3	-2	-1	0*	1	2	3	**Attracted**
Annoyed	-3	-2	-1	0	1	2	3	**Pleased**

For me, a Vegan Quesadilla on the lunchtime menu would be….

	Very		Somewhat		Somewhat		Very	
Boring	-3	-2	-1	0	1	2	3	**Exciting**
Undesirable	-3	-2	-1	0	1	2	3	**Desirable**

How likely is it that you would choose a Vegan Quesadilla to eat for lunch?

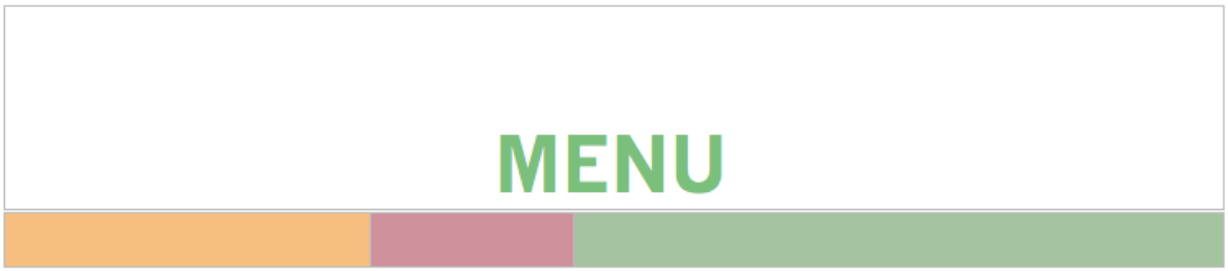
	Very		Somewhat		Somewhat		Very	
Unlikely	-3	-2	-1	0	1	2	3	**Likely**

*Choose '0' if you are neutral.

Appendix B

Menus used in food choice experiment

Default Menu (Positively evaluated menu options)



Five-Cheese Vegetarian Lasagna

Penne Pasta with Provencal Vegetables

Grilled Cheese Sandwich

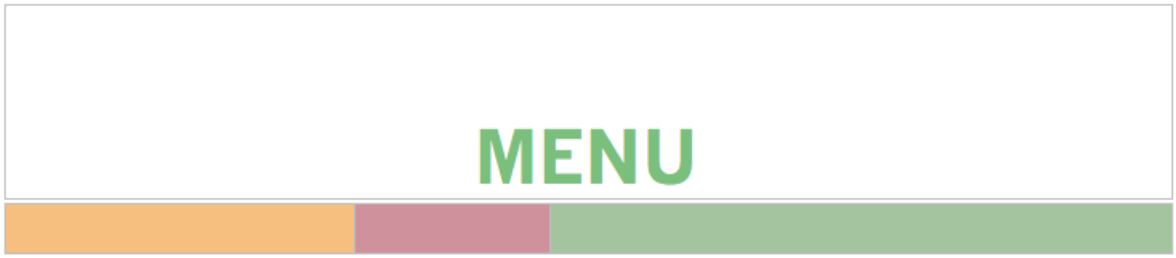
Cheese Ravioli

Macaroni and Cheese

Additional menu items can be found on the menu posted on the wall.

Culinary Services
MSU Residential and Hospitality Services

Posted Menu



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General Tso's Chicken with Rice

Grilled Chicken Sandwich

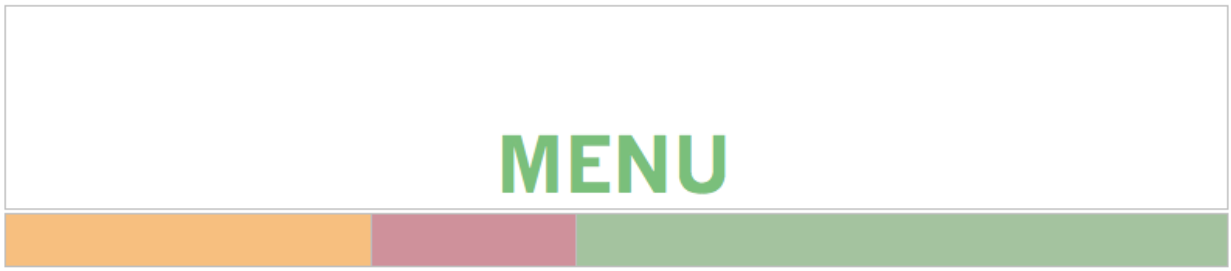
Chicken and Green Bean Alfredo with Fettuccini Noodles

Grilled Salmon with a Jack Daniel's Glaze

Cheeseburger

Culinary Services
MSU Residential and Hospitality Services

Default + Information Menu (Positively evaluated menu options)



Five-Cheese Vegetarian Lasagna

Penne Pasta with Provencal Vegetables

3-Cheese Grilled Cheese Sandwich

Cheese Ravioli

Macaroni and Cheese

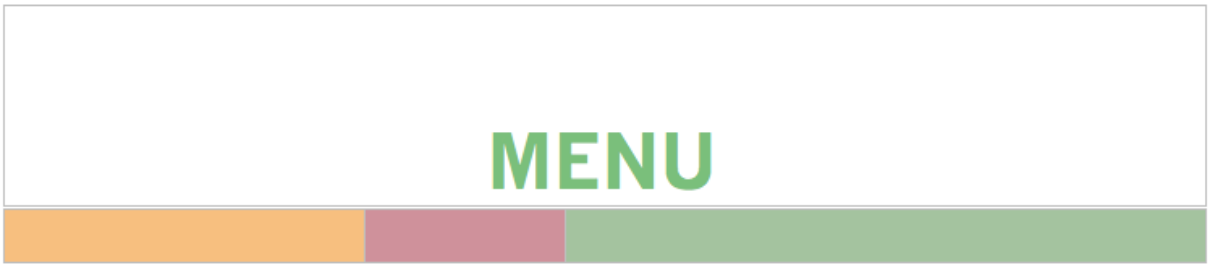
This symbol on the menu identifies a meat-free meal option.

Recent scientific studies have suggested that consuming less meat can help to reduce our environmental impact.

Additional menu items can be found on the menu posted on the wall.

Culinary Services
MSU Residential and Hospitality Services

Information Menu (Positively evaluated menu options)



Five-Cheese Vegetarian Lasagna

General Tso's Chicken with Rice

Penne Pasta with Provencal Vegetables

3-Cheese Grilled Chicken Sandwich

Grilled Cheese Sandwich

Chicken and Green Bean Alfredo with Fettuccini Noodles

Cheese Ravioli

Grilled Salmon with a Jack Daniel's Glaze

Macaroni and Cheese

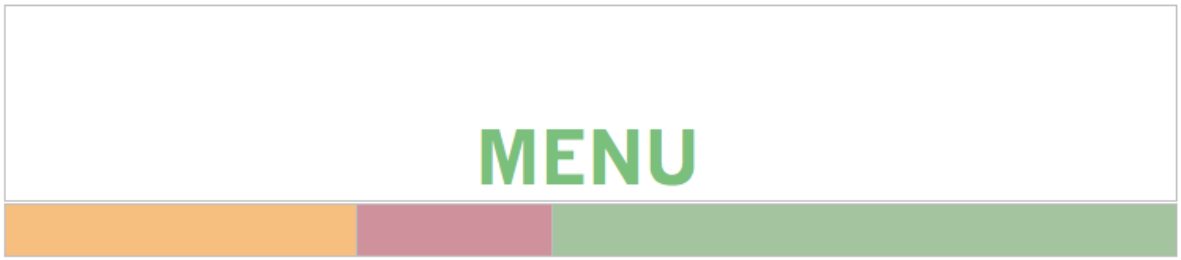
Cheeseburger

This symbol on the menu identifies a meat-free meal option.

Recent scientific studies have suggested that consuming less meat can help to reduce our environmental impact.

Culinary Services
MSU Residential and Hospitality Services

Control Menu (Positively evaluated menu options)



Five-Cheese Vegetarian Lasagna

General Tso's Chicken with Rice

Penne Pasta with Provencal Vegetables

Grilled Chicken Sandwich

3-Cheese Grilled Cheese Sandwich

Chicken and Green Bean Alfredo with Fettuccini Noodles

Cheese Ravioli

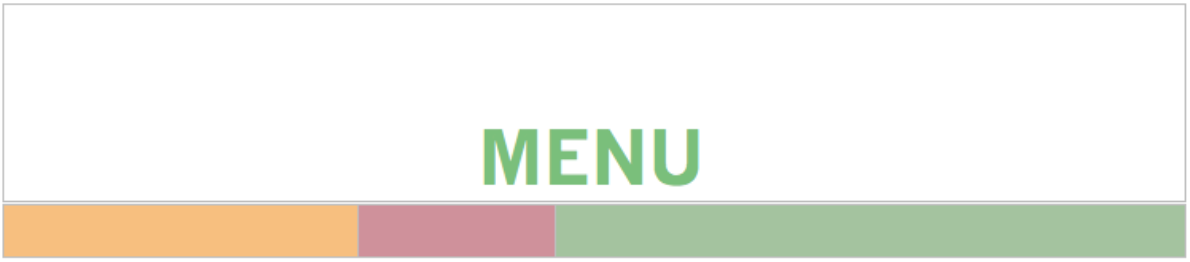
Grilled Salmon with a Jack Daniel's Glaze

Macaroni and Cheese

Cheeseburger

Culinary Services
MSU Residential and Hospitality Services

Default Menu (Negatively evaluated menu options)



General Tso's Tofu with Rice

Tortellini Eggplant Parmesan

Vegan Calzone

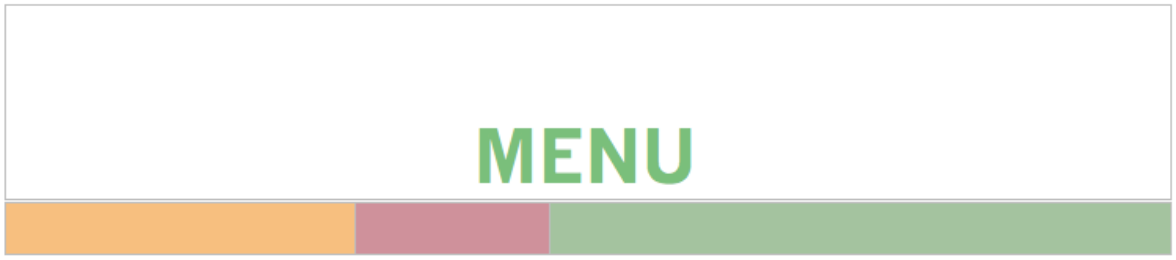
Tofu Marinara

Vegetarian Sloppy Joe

Additional menu items can be found on the menu posted on the wall.

Culinary Services
MSU Residential and Hospitality Services

Default + Information Menu (Negatively evaluated menu options)



General Tso's Tofu with Rice

Tortellini Eggplant Parmesan

Vegan Calzone

Tofu Marinara

Vegetarian Sloppy Joe

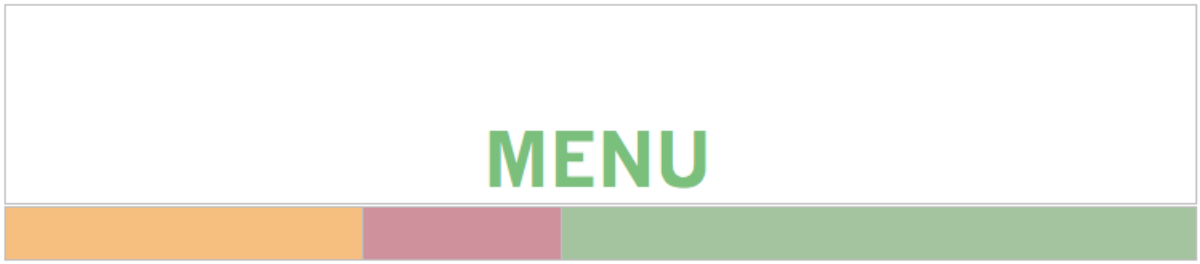
This symbol on the menu identifies a meat-free meal option.

Recent scientific studies have suggested that consuming less meat can help to reduce our environmental impact.

Additional menu items can be found on the menu posted on the wall.

Culinary Services
MSU Residential and Hospitality Services

Information Menu (Negatively evaluated menu options)



General Tso's Tofu with Rice

General Tso's Chicken with Rice

Tortellini Eggplant Parmesan

Grilled Chicken Sandwich

Vegan Calzone

Chicken and Green Bean Alfredo with Fettuccini Noodles

Tofu Marinara

Grilled Salmon with a Jack Daniel's Glaze

Vegetarian Sloppy Joe

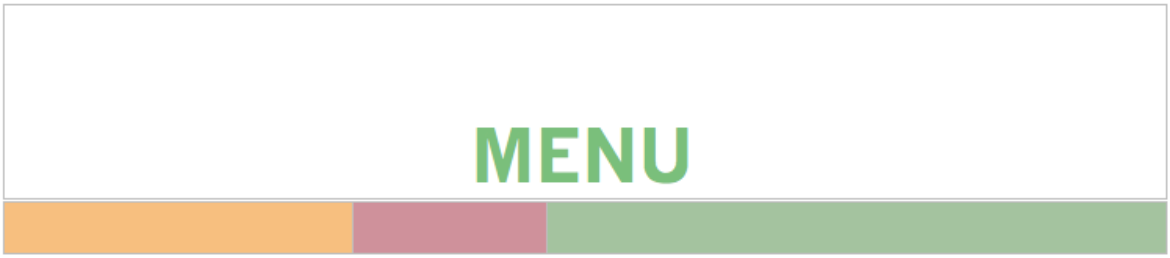
Cheeseburger

This symbol on the menu identifies a meat-free meal option.

Recent scientific studies have suggested that consuming less meat can help to reduce our environmental impact.

Culinary Services
MSU Residential and Hospitality Services

Control Menu (Negatively evaluated menu options)



General Tso's Tofu with RIce

General Tso's Chicken with Rice

Tortellini Eggplant Parmesan

Grilled Chicken Sandwich

Vegan Calzone

Chicken and Green Bean Alfredo with Fettuccini Noodles

Tofu Marinara

Grilled Salmon with a Jack Daniel's Glaze

Vegetarian Sloppy Joe

Cheeseburger

Culinary Services
MSU Residential and Hospitality Services

Appendix C

Schwartz Value Survey Questions

New Ecological Paradigm Scale Questions

Schwartz Value Survey:

Please tell us – on a scale of 1 (*not important to me*) to 7 (*extremely important to me*) – how important each of these items is as <u>a guiding principle in YOUR life</u>.

Try to vary your answers as much as you can (but still being true to your beliefs). In other words, circle only the highest scores (6 or 7) for the items that are <u>the most important to you</u>, and then score the other items accordingly.

Item (Definition)	**Scale** *Please circle your response for each item on the number scale provided*						
	Not important to me 1	2	**Important to me** 3	4	5	6	**Extremely Important to me** 7
Authority (Having control or dominance over others)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Tradition (Honoring my parents and elders, showing respect)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Equality (Providing equal opportunity for all)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Self-direction (Being independent, interested in everything, exploring)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Respecting the earth (Being in harmony with other species)	**1**	**2**	**3**	**4**	**5**	**6**	**7**

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Schwartz Value Survey continued…

Please tell us – on the scale provided – how important each of these items is as <u>a guiding principle in YOUR life</u>.

Try to vary your answers as much as you can (but still being true to your beliefs). In other words, circle only the highest scores (6 or 7) for the items that are <u>the most important to you</u>, and then score the other items accordingly.

Item (Definition)	**Scale** *Please circle your response for each item on the number scale provided*						
	Not important to me 1	2	**Important to me** 3	4	5	6	**Extremely Important to me** 7
Security (Knowing that loved ones and family are safe)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Conformity (Being restrained, and resisting temptation)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Unity with nature (Fitting into nature)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Influence (Having an impact on people and events)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
A world at peace (A world free of war and conflict)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Protecting the environment (Preserving nature)	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Continued on next page…

Schwartz Value Survey continued…

Please tell us – on the scale provided – how important each of these items is as a guiding principle in YOUR life.

Try to vary your answers as much as you can (but still being true to your beliefs). In other words, circle only the highest scores (6 or 7) for the items that are the most important to you, and then score the other items accordingly.

Item	Scale *Please circle your response for each item on the number scale provided* **Not important to me 1**	**2**	**Important to me 3**	**4**	**5**	**6**	**Extremely Important to me 7**
Stimulation (Having an exciting life, stimulating experiences)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wealth (Having material possessions, money)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Variety (Having a life filled with challenge, novelty and change)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Social justice (Working to correct injustice, care for the weak)	**1**	**2**	**3**	**4**	**5**	**6**	**7**

New Ecological Paradigm Scale

Listed below are statements about the relationships between humans and the environment. For each one, please indicate your level of agreement by circling your response on the number scale.

Statement	**Level of Agreement** (*Please circle your response for each item*)				
	STRONGLY DISAGREE	**MILDLY DISAGREE**	**UNSURE**	**MILDLY AGREE**	**STRONGLY AGREE**
	1	**2**	**3**	**4**	**5**
1. We are approaching the limit of the number of people the earth can support	**1**	**2**	**3**	**4**	**5**
2. Humans have the right to modify the natural environment to suit their needs	**1**	**2**	**3**	**4**	**5**
3. When humans interfere with nature it often produces disastrous consequences	**1**	**2**	**3**	**4**	**5**
4. Human technology will insure that we DO NOT make the earth unlivable	**1**	**2**	**3**	**4**	**5**
5. Humans are severely abusing the environment	**1**	**2**	**3**	**4**	**5**

Continued on next page…

New Ecological Paradigm Scale continued…

Listed below are statements about the relationships between humans and the environment. For each one, please indicate your level of agreement by circling your response on the number scale.

6. The earth has plenty of natural resources if we just learn how to develop them	**1**	**2**	**3**	**4**	**5**
7. Plants and animals have as much right as humans to exist	**1**	**2**	**3**	**4**	**5**
8. The balance of nature is strong enough to cope with the demands of modern industrial nations	**1**	**2**	**3**	**4**	**5**
9. Despite our special abilities humans are still subject to the laws of nature.	**1**	**2**	**3**	**4**	**5**
10. The "environmental crisis" facing humans has been greatly exaggerated	**1**	**2**	**3**	**4**	**5**

New Ecological Paradigm Scale continued…

Listed below are statements about the relationships between humans and the environment. For each one, please indicate your level of agreement by circling your response on the number scale.

Statement	**Level of Agreement** (*Please circle your response for each item*)				
	STRONGLY DISAGREE 1	**MILDLY DISAGREE** 2	**UNSURE** 3	**MILDLY AGREE** 4	**STRONGLY AGREE** 5
11. The earth is like a spaceship with very limited room and natural resources	**1**	**2**	**3**	**4**	**5**
12. Humans were meant to rule over the rest of nature	**1**	**2**	**3**	**4**	**5**
13. The balance of nature is very delicate and easily upset	**1**	**2**	**3**	**4**	**5**
14. Humans will eventually learn enough about how nature works to be able to control it	**1**	**2**	**3**	**4**	**5**
15. If things continue on their present course, we will soon experience a major environmental catastrophe	**1**	**2**	**3**	**4**	**5**

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CHAPTER 5

Conclusion

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Our choices and behaviors can have a profound effect on the health of the environment. Our food choices in particular, and the amount of energy and resources required to sustain them, have been linked to habitat destruction, climate change, and loss of biodiversity; not to mention the issue of the unequal distribution of resources and negative environmental outcomes around the globe (Blair & Sobal, 2006; Cafaro, 2006; Carlsson-Kanyama, 1998; Gerbens-Leenes & Nonhebel, 2002; McAlpine et al., 2009; Smil, 2002; White, 2000).

While much effort has been directed at solving food-related environmental problems via technical solutions, e.g., the genetic modification of domestic pigs to reduce the amount of polluting nutrients they excrete (Golovan et al., 2001), or the adoption of increasingly costly and complex manure management technologies (Steinfeld & Wassenaar, 2007), many of the environmental problems we face today can be addressed – at least in part – through relatively simple (and low-cost) changes in the behavior of individuals, e.g., by minimizing our own waste, or through changes in the kinds and quantities of foods we eat. Indeed, a recent paper by Dietz et al. (2009) points to a variety of household and individual-level behavior changes, e.g., changes in driving behavior or improvements in home insulation, that can contribute to significant reductions US $C0_2$ emissions over the next 10 years. While food choice was not included in the Dietz et al. study, it is similarly important for us to address the implications of our food choices for the health of the environment (as noted above), and to take action to minimize these negative environmental outcomes (Deckers, 2010). The related interdisciplinary fields of

behavioral decision research and decision analysis can provide insight into how best to facilitate environmentally significant changes in our behavior.

Specifically, the research presented in this dissertation addressed the issue of how to incorporate concerns about the health of the environment into our food decisions, be they the small choices we make every day or the much larger decisions relating to what foods should be served in a university or made available within a community. This research took as its starting point insights from the interdisciplinary fields of behavioral decision research and decision analysis. Insights from behavioral decision research and decision analysis can help us to understand why it may be challenging to make decisions that are in line with these goals, e.g., the systematic shortcuts and biases that tend to pervade our decision-making (often without our knowledge or conscious awareness), as well as suggest approaches we can take to account for these short-cuts and biases, e.g., structuring the decision-making process and employing choice architecture (behavioral interventions).

Ultimately, the results of this research could be applied to help achieve four broad objectives. The first objective is to encourage other researchers to incorporate insights from behavioral decision research and decision analysis to gain a greater understanding of why people do or do not engage in pro-environmental behaviors (or pro-health or pro-social), particularly in the realm of food choice. The second objective is to have this research contribute to a greater acceptance and adoption of behavioral interventions and decision structuring efforts to address individual and societal level concerns about

personal health and environmental sustainability (and to supplement education and information provision). The third overarching objective is to add to a more theoretical discussion of when and how behavioral interventions like defaults are most efficacious and appropriate, e.g., the influence of the relative affective appeal of default options. Finally, many researchers have called for the continued testing of defaults and other behavioural interventions in a variety field settings and more realistic scenarios to help ensure that the results are useful for practitioners as well (Amir et al., 2005; Milkman et al., 2008; Ratner et al., 2008), thus the fourth objective is to have this research contribute to broader policy-related goals through the successful application of a default behavioral intervention to a new context (encouraging sustainable food choices) and within a large institutional setting (Michigan State University's campus food system).

The principles discussed in Chapter 2 apply both to decisions made by an individual consumer on behalf of themselves and those closest to them (e.g., family members), as well as those individuals or groups that have a responsibility to procure and provide food on a much larger scale (e.g., grocery stores, restaurants, cafeterias, hospitals, etc.). These principles, derived from behavioral decision research, decision analysis, and the constructive nature of preferences, can be applied to help both individuals and groups make 'better' decisions and – ultimately – more defensible choices, i.e., avoid many of the decision-making biases that may prevent the achievement of desired outcomes. These included: (i) obtaining a clear and complete sense of what matters in food decisions, (ii) identifying appropriate measures for these objectives, (iii) providing effective feedback, and (iv) structuring the decision-making process – in the case of

larger and more complex decisions with multiple stakeholders, or – in the case of smaller and more frequent decisions – using behavioral interventions like commitment devices and defaults to make it easier for individuals to 'do the right thing'.

Indeed, a recent flurry of reviews and opinion pieces speak to a growing recognition of the usefulness of applying principles from behavioral decision research and decision analysis, e.g., choice architecture and decision structuring, in a variety of arenas, e.g., combating obesity (Just & Payne, 2009), the promotion of healthy behaviors (Loewenstein, Brennan, & Volpp, 2007), maximizing consumer welfare (Milkman et al., 2008; Ratner et al., 2008), motivating pro-environmental behavior (Abrahamse, Steg, Vlek, & Rothengatter, 2005; Steg & Vlek, 2009), and addressing community concerns in food- and agriculture-related decisions (Gregory & Gregory, 2010).

In Chapter 3, an exploratory focus group and interview study served to capture a broad list of students' food-related objectives and the connections between them. Although many students drew connections between their personal food choice (or the food and agriculture – related practices of others) and a variety of negative environmental outcomes, these results revealed the need for an information campaign that would help students to further identify and clarify these connections. This is of particular significance, since achieving environmental sustainability goals is an important campus-wide and Residential and Hospitality Services objective.

Likewise, the objectives elicitation process revealed areas where an information and education campaign can help students to make clearer and more extensive connections between their own food consumption habits and the health of the environment. In this sense, the means-ends objective network generated from discussions with MSU students functioned as a kind of mental model, representing –to the fullest extent possible – how students characterize their own food choice (Morgan et al., 2002). In turn, this can serve as a 'jumping off point' for both informational and behavioral efforts to help students more effectively address their fundamental food-related objectives, whether they relate to health, the environment, ethical concerns, or food safety (cf. Bostrom, Morgan, Fischhoff, & Read, 1994; Morgan et al., 2002)[33].

In addition, the means-ends objective network that emerged out of discussions with freshmen students at Michigan State University (MSU) was the result of a novel application of the initial stages of the decision-structuring process (Gregory, 2000; Gregory & Keeney, 2002). Ultimately the ends (fundamental) objectives that students sought through their food choices, e.g., healthy food, ethical food, tasty and pleasurable food, can serve as the starting point of a more extensive dialogue between students and Residential and Hospitality Services (RHS) staff addressing the question of what to serve in MSU dining halls that is more in keeping with the University's long-term goals relating to environmental sustainability.

[33] In Bostrom et al. (1994) and Morgan et al. (2002) mental models about a particular issue, e.g., global climate change, are constructed for both 'laypeople' and 'experts'; differences and discrepancies between these two models point to areas where communication efforts can be most effectively directed.

To date, though, the decision structuring process has been applied almost exclusively to problems relating to the management of environmental resources, e.g., in the development of a management plan for the Tilamook Bay Estuary in Oregon (Gregory, 2000), an integrated resource plan for British Columbia Gas (Keeney & McDaniels, 1992), or the allocation of water use on the Allouette River in British Columbia (McDaniels, Gregory, & Fields, 1999).

However, two recent examples of the application of structure decision-making to food and energy use point perhaps to a growing recognition of the applicability of these techniques to a much broader set of decision problems and contexts. For example, MSU is in the process of planning to transition away from an almost exclusive reliance on the coal-fired power plant, to a greater employment of renewable energy technologies, e.g., geothermal, solar, and biomass. To this end, university researchers are in the process of developing a stakeholder based on-line decision-structuring process to guide the transition (MSU Office of Campus Sustainability, Energy Transition Plan). In addition, Gregory and Gregory (2010) describe an application of the structured decision-making process to community food decision-making in Nanaimo, British Columbia, Canada, with the ultimate goal of developing a more just, healthy, ethical, and environmentally sound food system in that community.

The connection between food choice, the health of the environment, and MSU's sustainability goals informed the fourth chapter of this dissertation, which described the use of a behavioral intervention (in this case a default food choice) to achieve pro-

environmental outcomes (as opposed to solely relying on information provision or the intrinsic motivation – e.g., values or worldview – of individuals).

The provision of meat-free meal choices as the default menu option was a powerful influence on students' meal choice, and served to illustrate the effectiveness of structuring the decision-making environment ('choice architecture') to facilitate choices with a variety of beneficial outcomes, e.g., health, environmental, ethical. To date, defaults have been applied in limited settings, e.g., the selection of retirement plans (Thaler & Benartzi, 2004), green energy (Pichert & Katsikopoulos, 2008), or healthy fast food options (Downs et al., 2009), and with a primarily academic audience in mind.

However, behavioral interventions designed by Brian Wansink of Cornell University – aimed at encouraging healthier eating in school cafeterias and healthier food choices in grocery stores – have garnered considerable attention in the media (Black, 2010; Fulton, 2010; Wasnsink, Just, & McKendry, 2010). These developments speak further to the potential of defaults to be used in a variety of *applied* settings, from encouraging school children to make healthier food choices to the adoption to more environmentally sustainable – and climate-friendly – options in everyday life.

Still, and despite the fact that default behavioral interventions do not *remove* options but instead make options more or less convenient for the decision-maker, there are legitimate concerns about the autonomy and independence of individuals facing such structured decision environments (Smith et al., 2008). However, research has

consistently shown that our choices can be heavily influenced by incidental contextual cues or affect-based decision shortcuts (Ariely & Norton, 2008; Milkman et al., 2008; Samuelson & Zeckhauser, 1988; Shiv & Fedorikhin, 1999) – whether we are aware of it or not.

Using defaults and other behavioral interventions to advance agreed upon individual and societal goals may go against how we envision we make decisions (deliberate, thoughtful, and informed), but they instead harness what we know to be common errors and biases (e.g., affect heuristic, status quo bias) in order to make our lives healthier or more environmentally benign. The key is to be transparent in the decision to employ defaults, and to spend time clarifying what should be achieved *before* their deployment. Otherwise even the most well-intentioned behavioral interventions may be considered manipulative or deceptive.

In terms of future research, the semi-structured and open-ended approach to eliciting means and ends objectives was very informative, and – as has already been mentioned – I would welcome the opportunity to follow through with this and the rest of the structured decision-making process, e.g., identifying attributes and alternatives, and confronting trade-offs, in addressing the question of what foods to serve in campus dining halls (or elsewhere). Indeed, the structured decision-making approach is well-suited to tackling many of the vexing environmental problems facing government, communities, and institutions alike, e.g., food and agricultural production, energy use and conservation, or balancing economic demands with quality of life. However, as was

discussed in the second chapter of this dissertation, considerable thought and effort must first be directed towards finding suitable attributes to quantify, and provide feedback on, the achievement of fundamental decision objectives – whatever they may be.

I also hope to continue my research on behavioral interventions (both applied and theoretical), particularly within the realm of encouraging and motivating pro-environmental behavior. Specifically, and has already been discussed in Chapter 4, work remains to be done on elucidating the efficacy of defaults on a number of fronts.

First, varying the affective (instinctive emotional) appeal of default options should be tested using actual food choices. While the experiment described in this dissertation showed that offering affectively appealing default food options increased the effectiveness of the default intervention relative to when affectively unappealing food options were offered, a follow-up study could clarify if this effect remains once the menu choices have been tasted and evaluated. Similarly, the effectiveness of defaults over the longer term has not yet been explored; specifically, would offering the same default food options result in a decline in the efficacy of the default intervention over time? In other words, does varying what is offered as the default enhance the efficacy of that intervention? Finally, pairing defaults with more targeted support information (incorporating work on descriptive and prescriptive norms), would serve to clarify the relative effectiveness of these two motivational interventions. For this, I would model the informational messages after the reference-group specific messages employed by

Goldstein et al. (2008) in their study of the efficacy of descriptive social norms in motivating pro-environmental behaviors in hotel rooms.

In addition, and as personalized feedback has previously proven effective in motivating healthier eating behaviors, I hope to be able to tackle questions related to the efficacy of feedback in motivating pro-environmental behavior in a variety of contexts in addition to food consumption, e.g., home and institutional energy use, or commuting mode choice.

Ultimately, the achievement of personal and societal goals relating to environmental sustainability, health, ethics, etc., will require a broad range of approaches. Information provision and education have the potential to effect behavior change over the long term, e.g., through the introduction of new norms of behavior, or by introducing new ways of thinking and talking about these issues. Interventions based on the principles of behavioral decision research, e.g., defaults, personalized feedback, and the use of structured decision-making processes, can be put in place to achieve critical environmental health and sustainability objectives on a more immediate basis.

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