

WHAT AGRICULTURAL PRACTICES ARE CONSIDERED NATURAL? CONSUMER
PERCEPTIONS OF BIRD DAMAGE-CONTROL METHODS USED ON FRUIT

By

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ABSTRACT

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Many consumers have expressed a desire for more transparency within the food system. This desire stems from a variety of issues including health, environmental, and ethical concerns. The rapid growth of organic and fair trade products has increased pressure on producers to provide more information about the practices embodied in food and agricultural production. The market success of foods advertised as “natural” suggests that foods with a higher degree of perceived naturalness tend to be preferred by at least a subset of consumers. While a fair amount is known about what consumers consider to be natural regarding the processing of food, perceptions of natural dealing with agricultural and production practices are not nearly as well-defined from the consumer perspective. The techniques used by farmers to mitigate bird damage to fruit crops are prime examples of agricultural methods that have the potential to influence sales, but have not been rigorously researched. Through focus groups and a nationally representative survey, this thesis explores consumer perceptions of naturalness in relation to their preferences regarding common bird damage-control methods. Generally speaking, identifying which agricultural methods consumers favor may encourage growers to adopt those methods, leading to further development of niche markets and possible price premiums for crops grown these methods.

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Zachary B. Herrnstadt

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CHAPTER 1

Political Consumerism and Consumer Willingness to Pay for Specific Agricultural Methods

Many consumers have expressed a desire for more transparency within the food system (Beekman 2008; Bremmers et al. 2010; Caswell 1998; Howard 2006, 2010; Howard and Allen 2010). This desire stems from a variety of issues including food scares due to contamination, health concerns, as well as environmental and ethical concerns. The rapid growth and popularity of both organic and fair trade products in recent decades has increased pressure on producers to provide more information about the practices embodied in food and agricultural production, particularly those related to ecological impacts and animal welfare (Howard 2006; Howard and Allen 2010). While a fair amount is known about what consumers consider to be natural regarding the processing of food, with the exception of organic standards, perceptions of natural dealing with specific agricultural and food production practices are not nearly as well defined from the consumer perspective. Less is known about other specific agricultural and food practices, however.

The techniques used by fruit producers to mitigate bird damage to fruit crops are prime examples of agricultural methods that have the potential to influence the sales (positively or negatively) of food crops, but have not been rigorously researched (Lindell et al. 2012). Increased knowledge of bird damage-control methods may even increase or decrease a consumer's willingness to pay for a product (ibid). It is also possible that a farmer's choice of bird damage-control methods could have a larger market impact than methods utilized for other pests, due to the fact that birds have a greater charismatic appeal than other pests such as insects (Sergio et al. 2006), and that 21% of the US population reports participating in bird watching

activities (Carver 2009). Identifying which bird damage-control methods are favored by consumers may encourage growers to adopt those methods (Lindell et al. 2012). This adoption could lead to the further development of niche markets with the possibility of price premiums for crops grown utilizing consumer-preferred bird damage-control methods (ibid). Additionally, incorporating bird damage-control methods into a third-party certified eco-label may be a future possibility (Treves and Jones 2010), however, additional research into consumer preferences for these methods would be required.

In the remainder of this introductory chapter I review several bodies of consumer literature, focusing on political consumerism and consumer willingness to pay for certain agricultural methods. This chapter concludes with a discussion of the goals of the project as a whole and how my thesis research fits with those goals.

Chapter 2, presented as an academic article, investigates whether consumers prefer more “natural” food production practices. In order to explore this question, we conducted four focus groups with fruit consumers in the Lansing, Michigan area. Participants were asked about their perceptions of eight bird damage-control methods (see table 2 for definitions of methods). Transcript analysis suggests two overarching themes in what consumers consider to be natural when considering these bird damage-control methods: (1) a high degree of harmony between nature and humans, or the agricultural practices utilized by humans, and (2) a low degree of human intervention with nature. Responses suggest that the majority of participants also expressed a preference for fruit produced with more natural bird damage-control methods.

The third and final chapter summarizes the findings of this thesis research, including a brief discussion of results from the survey and experimental auction phases of the project. It also explores the broader implications of this research, including the creation of a third-party certified

eco-label featuring information about bird damage-control methods. The chapter closes with a call for further research addressing consumer perceptions of naturalness when it comes to agricultural and food production practices, arguing that this research could benefit producers, distributors, retailers, and consumers.

Political consumerism

If consumers do indeed prefer certain agricultural methods over others, choosing products based on political and/or ethical considerations, also known as political consumerism, could play an important role in expressing this preference (Micheletti et al. 2004; Stolle et al. 2005). Consumers can engage in political consumerism through participation in negative boycotts or positive “buycotts” using value-based eco-labels or other forms of information to guide their product choices (ibid). Through their purchasing practices, consumers may help to induce policy reform and convince producers to modify ethically dubious practices (Gulbrandsen 2006). Unlike more traditional forms of political action such as lobbying, boycotts and buycotts are better understood and more accessible to the general public (Arnould 2007; Howard and Allen 2010). Indeed, consumer participation in boycotts appears to be on the rise and is currently one of the most popular forms of political participation (Friedman 1999; Stolle et al. 2005; Newman and Bartels 2011).

Many consumers appear to factor political and ethical considerations into their food purchases. The Nestlé boycott of the late 1970s and early 1980s is an especially powerful example of political consumerism affecting the realm of food. Upset over Nestlé’s marketing of baby formula in third world countries, consumers throughout the world chose to boycott Nestlé products. In situations such as the above, the damage inflicted is two-fold: companies suffer a

financial blow due to decreased purchasing and receive the negative publicity that often accompanies boycotts. Notably, boycotts often require a high number of participants to be considered effective. Due to the difficulties involved in convincing a large enough group of people to change purchasing behaviors, boycotts typically enjoy only a limited amount of success (Friedman 1999; Howard and Allen 2010).

The growth and success of the local food movement is a more recent example of political consumerism influencing market demand for agricultural products (Hinrichs and Allen 2008). This growth has manifested itself through the rising popularity of farmers markets and CSAs, as well as through the increased presence of local food in larger supermarkets. Numerous academic studies have identified an increased consumer interest in local food (Howard and Allen 2010; Wolf et al. 2005; Zepeda and Leviten-Reid 2004). Others have pointed to an increased willingness to pay for local foods (Adams and Adams 2009; Adams and Salois 2010; Darby et al. 2008; Toler et al. 2009).

Consumer willingness to pay for specific agricultural methods

As mentioned above, consumer interest in the agricultural production methods producers use to grow or raise the food they eat is increasing. The success of the organic label, despite frequently carrying a price premium when compared to similar products, is one example of this growing consumer interest, with 78% of U.S. families reporting that they purchased organic food in 2011 and four in ten reporting that they purchased more organic products than they did the previous year (Organic Trade Association 2011a). A number of studies have shown that consumers indicate a willingness to pay a price premium for organic foods (Batte et al. 2007; Canavari et al. 2003; Krystallis and Chrysosoidis 2005; Tagbata and Sirieix 2008). Others have found that the

majority of consumers are only willing to pay a price premium for healthy organic foods such as produce, but not for snacks and sweets (Van Doorn and Verhoef 2011). Consumer purchasing habits appear to coincide with the above research, with organic produce experiencing especially strong growth recently. Representing almost twelve percent of total U.S. produce sales in 2010, organic produce sales continue to achieve double-digit annual gains (Organic Trade Association 2011b).

The success of fair trade products is another example of consumer interest in the ethics and values behind food. As with organic products, a number of findings suggest that certain groups of consumers may be willing to pay a price premium for fair trade goods. In separate studies, both De Pelsmacker et al. (2005) and Louriero and Lotade (2005) found that consumers were willing to pay a price premium for coffee identified as fair trade. Fair trade chocolate bars were also found to garner price premiums from some consumers (Tagbata and Sirieix 2008). Though the literature suggests that some consumers may be willing to pay more for organic and fair trade products, it is important to point out that other factors such as taste and preexisting preference for a particular product likely also play some role in this increased willingness to pay (De Pelsmacker et al. 2005; Poelman et al. 2008).

Study overview

This thesis work is one piece of a larger multidisciplinary study funded by the USDA Specialty Crop Initiative and conducted by researchers in Michigan, New York, and Washington studying bird damage-control methods used by farmers on Honeycrisp apples, sweet and tart cherries, grapes, and blueberries. The overall goal of the study is to “provide producers with cost-effective, environmentally sustainable bird management strategies” (Limiting Bird Damage to

Fruit Crops 2012). In order to achieve this overarching goal, the members of the research team developed the following five objectives:

- 1) Quantify economic consequences of bird damage for producers, consumers, and regional economies.
- 2) Determine how bird damage varies within and across spatial scales.
- 3) Identify amounts of damage attributable to specific bird species across crops and regions.
- 4) Investigate consumer responses to bird management strategies and potential effects on marketing.
- 5) Test bird management strategies for efficacy.

Dr. Philip Howard, Dr. Chi-Ok Oh, and myself were responsible for investigating objective number four. Three components were employed in order to thoroughly explore consumer responses to bird damage-control methods and their potential effects on marketing. First, focus groups were utilized in order to explore consumer preferences and perceptions of eight common bird damage-control methods. These in-depth discussions informed the design of the additional stages of research and were the primary source of data for this thesis. Second, a nationally representative online survey was created and distributed in order to measure consumer stated preference, determine which techniques consumers preferred, and to learn more about what issues related to bird damage control-methods consumers consider while purchasing fruit. Lastly, experimental auctions were conducted in order to determine revealed preference. These auctions were designed to provide additional data regarding consumer willingness to pay with which to compare to the survey data.

CHAPTER 2

Consumer Preferences for More “Natural” Food Production Practices

Abstract

Consumer interest in the practices embodied in food production is rising, leading to increasing pressure for producers to disclose more information about such practices. Food products are often touted as “natural,” implying superiority over “less natural” products, but these claims most commonly refer to how they were processed. Consumer perceptions of natural with respect to specific agricultural management practices (with the exception of genetic engineering) are not well defined. In addition, it is not clear if consumers would prefer agricultural management practices that they view to be more natural over those that they consider to be less natural. To explore these questions, we conducted four focus groups with fruit consumers in the Lansing, Michigan area. Participants were asked about their perceptions of eight bird damage-control methods. Transcript analysis suggests two overarching themes in what consumers consider natural: (1) a high degree of harmony between nature and humans, or the agricultural practices utilized by humans, and (2) a low degree of human intervention with nature. Responses suggest that the majority of participants also expressed a preference for fruit produced with more natural bird control methods. A notable component in consumer definitions, however, was preferring biological behaviors over social actions, even if the impacts were quite similar. Considering consumer perceptions of naturalness when selecting agricultural practices may increase the market success of products embodying these practices.

Introduction

Consumer interest in the practices embodied in food production is rising. As a result, there is increasing pressure for producers to provide more information about such practices, particularly those related to ecological impacts and animal welfare. “Political consumers” are leading the demands for more information from producers in order to shift their purchasing choices in ways that support preferred values (Gulbrandsen 2006; Micheletti et al. 2004; Stolle et al. 2005). Naturalness is often used as a selling point for food, with food products being touted as natural and thus superior to and more desirable than other “less natural” products. This superiority is often based on what has been excluded from the product itself. In fact, the processes and methods involved in or withheld from the production of food can play a larger role in consumer perceptions of naturalness than the content of the food itself (Rozin 2005; 2006). For instance, participants in a study involving consumers from Europe and America were more apt to define the naturalness of a product based on the absence of a trait perceived to be negative than the presence of a positive trait (Rozin et al. 2012). A number of successful grocery chains have certainly taken notice. For example, Whole Foods Market provides a detailed list of ingredients they deem unacceptable and therefore not present in the food products that they offer (Whole Foods Market 2013).

The market success of foods advertised as “natural” suggests that foods with a higher degree of perceived naturalness tend to be preferred by at least a subset of consumers. While a fair amount is known about what consumers consider to be natural regarding the processing of food, perceptions of natural dealing with specific agricultural and food production practices are not nearly as well-defined from the consumer perspective. Learning more about consumer

perceptions of these production methods is essential as consumers are increasingly factoring them into purchasing decisions (Deliza et al. 2003; Grunert et al. 2003; Huevel et al. 2008).

As mentioned above, a considerable amount is known about what consumers consider to be natural when it comes to a variety of food processing techniques and technologies. Previous research has shown that the perceived naturalness of a food processing technique can play an important role in a consumer's perception of the technique, as well as in their acceptance of foods produced using that technique (Huotilainen and Tuorila 2005; Rozin 2005; Rozin et al. 2004; Siegrist 2008). A number of studies have indicated positive consumer opinions toward the use of high-pressure processing of food due to the fact that products produced using this technology retain sensory properties that are similar to fresh products (Deliza et al. 2004; Nielsen et al. 2008). While discussing perceptions of high-pressure processing and pulsed electric field processing of food, participants in focus group discussions conducted by Nielsen et al. (2008) cited naturalness as an important product attribute. For example, one participant explained that her preference for high-pressure processing over pulsed electric field processing was due to her belief that the former was more natural than the latter (*ibid*). Perceived naturalness has also been found to influence consumer perceptions of new food processing methods such as the use of nanotechnology in food and food packaging (Siegrist 2008; Siegrist et al. 2008).

There is at least one notable exception to the gap of knowledge regarding consumer perceptions of agricultural and food production practices. Organic foods and the consumer perceptions of the methods used to achieve organic standards have been assessed in a more rigorous fashion than other production practices. The desire of some consumers to avoid genetically engineered foods, which are not allowed under USDA organic standards, is undoubtedly one contributor to the growth of the organic foods industry over the past decade

(Gifford and Bernard 2006; Lockie et al. 2002; Padel and Foster 2005; Shaw 2002). Some consumers possess concerns that genetically engineered foods may affect human health and/or the health of the environment (Hu et al. 2004). These attitudes regarding genetically engineered foods have been found to vary geographically, however. Numerous surveys have found that European consumers are generally less accepting of genetically engineered foods than consumers from the United States (Hoban 1997; Moon and Balasubramanian 2002). A more recent study found consumers from Spain, Italy, and the US to be more accepting of genetically engineered foods than consumers from Nordic countries, Britain, and Germany (Costa-Font 2008). Consumer attitudes toward nature have been found to influence attitudes toward genetically engineered foods (Bredahl 2001), with one study finding that genetically engineered foods perceived to be more natural by consumers have a better chance of being accepted by those consumers than genetically engineered foods that are perceived to be less natural (Huevel et al. 2008). Less is known about other specific agricultural and food practices, however.

Taking the above into account, I consider the following questions: (1) How do consumers define natural with respect to agricultural management practices? And (2) do consumers prefer agricultural and food production practices viewed to be more natural over those that they consider to be less natural? To explore these questions, we conducted a series of four focus groups with fruit consumers in the Lansing, Michigan metropolitan area. Focus group participants were asked to discuss their perceptions of eight different bird damage-control methods used by fruit farmers to reduce crop damage. These methods were selected in part as a way to minimize pre-conceived consumer biases, as little is known about how consumers react to bird damage-control methods (Lindell et al. 2012), in contrast to better-known practices such as organic agriculture.

Below I briefly discuss why the use of focus groups was appropriate for this research. Next, I examine the definitions of naturalness common among the focus group participants, and explore if consumers expressed preferences for bird damage-control methods they perceived to be more natural. I then discuss the implications of this research for agricultural practices in general.

Methods

To explore consumer perceptions of naturalness, we conducted a series of focus groups in October and November of 2012. Focus groups offer a number of advantages over other qualitative methods. They can be a useful technique with which to gather a large amount of information about a variety of topics in a relatively short time (Morgan and Kruger 1998; Patton 2002). They also allow individuals to express and explain their subjective experiences. In addition, focus groups provide a forum for participants to interact and build off the statements and opinions of other participants.

Though focus groups feature a number of advantages over other methods, limitations also exist. Some of these potential limitations lie in the fact that focus groups feature interviews in a group setting rather than with individuals. This group dynamic can lead to more outspoken and opinionated participants dominating the conversation, leaving the quieter, more self-reflective participants underrepresented (Kornbluh 2012). Focus group discussions can also be dominated by disagreements between specific participants. These dynamics can lead to polarization within the group and even limit overall participation and content (Kornbluh 2012; Morgan and Krueger 1998; Patton 2002). Issues may also arise due to the influential role the facilitator plays in leading the focus group discussions (Kornbluh 2012; Morgan and Krueger 1998; Patton 2002).

As a result, consistency in facilitation style and technique within and between focus groups is essential to the data collection process. Literature especially stresses the importance of facilitating focus groups in a way that assures the conversation is not dominated by more vocal participants, while encouraging the participation of the quieter members (Morgan and Krueger 1998; Patton 2002). The most straightforward way to achieve even member participation is to directly ask quieter individuals to share their opinions, while also moving the dialogue forward by reminding more vocal participants that the group is only meeting for a limited time, and that it is important that others have the opportunity to voice their opinions as well.

The advantage of utilizing the topic of bird damage-control practices as a vehicle to explore consumer perceptions of naturalness is twofold. First, little is known about how consumers react to various bird damage-control practices (Lindell et al. 2012). Learning more about these reactions could help fruit farmers determine which methods consumers prefer, thereby increasing product appeal in the marketplace. Second, the lack of prior familiarity with these practices on the part of focus group participants minimizes bias, eliminating some of the preconceptions that would accompany discussions about better-known agricultural practices.

A majority of the literature indicates that conducting three to five focus groups will lead to a point of saturation in most cases and is therefore an appropriate number for rigorous qualitative studies (Guest et al. 2006; Morgan and Kruger 1998). Following this guideline, we conducted four focus groups, each comprising of six to twelve consumers from the Lansing, Michigan metropolitan area. Because little new information was provided during the fourth focus group, additional focus groups were deemed unnecessary. In order to ensure diverse representation, we recruited focus group participants in person from a natural foods co-op, an independent grocery store, a farmers' market, and the Michigan State University campus, with

each focus group consisting of participants from one location. A homogenous sampling technique such as this often leads to focus groups that consist of participants possessing similar backgrounds. This can promote richer, more dynamic interactions between participants, which can lead to higher quality data (Morgan and Krueger 1998; Patton 2002). Participants received an incentive of forty dollars cash at the conclusion of the focus group. Each of the four focus groups were moderated by Dr. Howard or myself, while the other assisted by taking detailed notes and running audio recording devices.

At the beginning of each focus group, participants were asked to fill out a brief written survey in order to obtain basic demographic information and fruit purchasing habits (see Appendix A). Since focus group research is intended to gather qualitative data that would be difficult to obtain through a survey format, a fully representative population was neither expected nor achieved. A total of 33 people participated in the focus groups. Approximately 58 percent of focus group members were female. This imbalance was anticipated due to the fact that women make around two-thirds of the grocery purchases in the United States (Nielsen 2013). A majority of participants self-identified as non-Hispanic white (75.8 percent) and possessed at least an undergraduate degree (66.7 percent). Although the focus groups were a non-random sample, the ethnicities of the participants did not differ substantially from the national averages reported in the 2011 US Census. A higher percentage of participants possessed graduate degrees than the national average, however. Below, Table 1 shows complete descriptive statistics for the focus groups.

Table 1: Descriptive statistics of focus groups (n = 33)

	Percentage	2011 U.S. Averages*
Categorical variables		
Gender		
Men	42.4	49.2
Women	57.6	50.8
Education (Degree Completed)		
High School	33.3	28.4
Undergraduate Degree	30.3	17.9
Graduate Degree	36.4	10.6
Ethnicity		
White	75.8	63.0
Black or African American	12.1	13.1
Hispanic or Latino	6.1	16.9
Asian	3.0	5.1
% Missing	3.0	1.9
Income		
<20 K	21.2	44.3
20-39,999	21.2	24.6
40-59,999	18.2	13.8
60-99,999	27.3	10.9
≥100 K	12.1	6.4
Age (years)		
18-20	6.1	4.1
21-44	42.4	32.2
45-64	27.3	26.4
65 and over	21.2	12.8
% Missing	3.0	

*U.S. Census 2011, 2012

Each focus group interview took 1.5 to 2 hours. Participants were provided a brief explanation of 8 bird control methods shown in Table 2. We described each method as neutrally as possible, using input from experts in the field. Participants were asked to discuss their perceptions of each method and then to explain why they liked or disliked the method. For a copy of the question route used in the focus groups, please refer to Appendix B.

Table 2: Definitions of bird damage-control methods

Method	Definition
Live ammunition	Firing live ammunition at birds in order to kill a few and frighten the rest.
Falconry	Hiring a falconer to fly a trained bird of prey on the farm in order to frighten birds.
Nest boxes	Placing nest boxes near fruit crops to attract birds of prey to nest in that area.
methyl anthranilate	Spraying a food additive commonly used as artificial grape flavoring directly onto crops in order to repel birds.
Netting	Affixing nets around fruit crops to prevent birds from reaching the fruit.
Visual scare devices	Placing objects such as plastic hawks or streamers on or near fruit crops in order to frighten birds.
Propane cannons or blanks fired from a gun	Frightening birds by producing loud, unexpected sounds.
Recorded predator calls or bird distress calls	Placing an electronic device in or around fruit crops that plays prerecorded calls through a speaker system.

The explanations were accompanied by the projection of photographs on a large screen to better illustrate the techniques. We presented the methods in a different, randomized order for each group. The focus groups were audio recorded, transcribed, and then coded using NVivo software. The coding process consisted of grouping participant comments by damage-control method. Comments regarding each method were then grouped according to whether they were positive, negative, and ambivalent towards the method. As suggested by Krueger et al. (1998), we noted the depth of positive and negative emotions expressed for each technique, as well as reoccurring themes, ideas, words, and unanticipated outcomes.

Results

Consumer definitions of natural

Though the moderator did not specifically ask participants about their perceptions of natural, it was a frequent theme in explaining the most liked and disliked bird damage-control methods. As a result, this was a focus of the transcript analysis. We found that the meanings of natural tended to fall into two main categories: (1) naturalness is dependent on harmony between nature and humans (or the agricultural methods utilized by humans), and (2) a low degree of human intervention with nature is necessary for a higher degree of naturalness to exist. Focus group participants discussed the harmony theme more frequently than the human intervention theme. As participants examined and evaluated the naturalness of agricultural methods, they tended to consider both the methods themselves, and the consequences of those methods.

It is important to note that naturalness can be defined as a binary concept (an object is considered either natural or unnatural), or on a continuum (an object can be “more” or “less” natural based upon a chosen definition). Literature exploring the concept of naturalness as related to agriculture typically utilizes the continuum viewpoint. The majority of group participants also described the naturalness of bird damage-control methods on a continuum, describing a method as “more” or “less” natural, rather than “natural” or “not natural.”

While existing literature has examined the concept of naturalness from a philosophical point of view, only a few studies have rigorously assessed how consumers define this term. The definitions of natural articulated by focus group participants tended to align with the most common philosophical definitions. These definitions emphasize the degree of human intervention involved in a practice or method (Anderson 1991; Ridder 2007; Siipi 2008; Siipi 2013), and the amount of harmony between nature and the humans/processes/technologies

interacting with nature (Léo and Pintureau 2013; Ridder 2007; Siipi 2008; Verhoog et al. 2003). A few dimensions noted by philosophers were not discussed by focus group participants, such as the evaluation of natural from a temporal standpoint (whether an object, action, or behavior existed in a region before an established historical benchmark) (Ridder 2007; Siipi 2008), or according to cultural and/or individual norms (Thompson 2011).

Prevalent themes: Balance, harmony, and human intervention

The ideas of balance and harmony were prevalent themes among focus group participants, as shown in the below comments regarding falconry:

It seems like you're inviting balance. I mean you've got an excess of birds that eat fruit.

Invite in a bird of prey to balance things out a little better.

They [the falcons] represent a balance—a balancing effect in the ecosystem. Especially since we've destroyed so many other predator species.

Participants also discussed the concept of harmony between nature and agricultural methods while expressing opinions about nest boxes, citing the promotion of predator/prey relationships as an especially positive feature:

This is taking advantage of the natural system of predators and prey, and I think it's a good thing.

It's more natural. It's letting nature do what it's supposed to do—the birds preying on the birds that are eating the fruit. Like she said, it balances it out. It's more natural—not forced.

One participant did remark that nest boxes were “artificial” because they involved some degree of human intervention (discussed further below). However, the same participant perceived nest boxes to be natural due to the fact that they were “promoting a natural process.” Another participant was concerned that nest boxes would encourage exotic species of birds of prey into the area, interfering with the balance of nature. Though these participants held differing opinions about the use of nest boxes, they both defined naturalness as harmony between nature and an agricultural method.

A low degree of human intervention with nature was the second common definition of naturalness discussed in the focus groups. Again referring to nest boxes, one respondent appreciated the fact that the birds considered to be pests would be killed by birds of prey, rather than through methods involving a higher degree of human intervention:

[The birds considered to be pests] are kind of dying in a natural way. It's not like they're getting poisoned. It's like the circle of life.

Interestingly, the phrase “the circle of life” was used by at least one person in each of the four focus groups, highlighting the importance of cycles and balance within the discussions. Another focus group participant felt that falconry was “more natural” because it utilized the falcon’s “natural reflex” to chase prey, again equating naturalness with a low degree of human intervention.

Though a high degree of harmony and a low degree of human intervention were by far the most popular definitions referenced by focus group participants, some also connected familiarity and a lack of additives to naturalness. A number of individuals reacted negatively toward any bird control method utilizing unfamiliar additives. For instance, when discussing

methyl anthranilate, one individual spoke of how “fruit is supposed to be clean and pure” and that the use of additives erodes that perception, while another said that “it seems weird” to spray artificial flavoring onto fruit. This supports research suggesting that consumers’ definitions of naturalness correspond closely with food advertisements and labeling, which often equate words such as “clean” and “pure” with naturalness (Sagoff 2001).

Do consumers prefer more natural agricultural management practices?

Focus group participants indicated much stronger preferences for agricultural management practices that corresponded with their views of “natural.” The majority of participants reacted positively towards the bird damage-control methods that were viewed as the most natural: the use of falconry and nest boxes. They also reacted negatively towards those that were viewed as less natural: the use of methyl anthranilate and live ammunition. Other methods, including the use of netting, propane cannons, firing shotgun blanks, recorded bird calls, and visual scare devices were not typically described as more natural or less natural, and elicited primarily neutral reactions.

A number of participants explained their preference for falconry as directly related to their perception that it is more natural than other bird control methods:

Seems like a sensible option because it ties into what naturally occurs.

I think [falconry] is the best one, because this is a natural ecosystem right here.

Interestingly, participants had a strong preference for both falconry and nest boxes when compared with live ammunition, even though they described the impacts (killing a few birds and frightening the rest) in very similar terms.

Perceptions of bird control methods as less natural on the other hand, were associated with much weaker preferences for these practices. While discussing the use of methyl anthranilate to keep birds off of fruit crops, one participant asked if the chemical was naturally found in grapes, or if it was an artificial flavoring agent. After being told that it was an artificial flavoring agent, the participant expressed a decidedly negative opinion towards its use, as well as the use of any artificially occurring chemicals in food:

I think that chemicals in food—their days are numbered, and it's not a good alternative.

One participant remarked that using methyl anthranilate on fruit crops “seems weird” while others displayed stronger negative reactions, such as this individual:

I'm not in favor of more food additives in any area. I wouldn't do it. If I knew they used it I wouldn't buy the fruit.

In two of the four focus groups, participants recalled scientific findings connecting negative health effects with food additives once deemed to be safe by the mainstream scientific community. When the moderator raised the possibility that fruit treated with methyl anthranilate might wash off prior to being sold, participants remained wary, and questioned whether rinsing would actually make a difference.

There were a number of bird damage-control methods that elicited predominantly neutral reactions from focus group members including the use of netting, propane cannons, shotgun blanks, recorded birdcalls, and visual scare devices. For the most part, participants did not focus heavily on the naturalness of these methods, choosing instead to discuss issues such as cost, sustainability, and feasibility. Individuals were far less emotional in their reactions towards these

bird damage-control methods. Discussions also tended to be shorter and less specific. For example, while discussing the use of recorded predator calls and bird distress calls, one participant simply stated “Yeah, I’m ok with it”, and another, “It seems alright”. Participants voiced similarly neutral reactions such as “Generally, I think it’s fine” when asked their opinions about netting.

Discussions and conclusions

What values underlie the pattern we observed of participants having much stronger preferences for practices that involved less human intervention, despite similar impacts? Part of the answer may be the perceived differences between social actions and biological behaviors. A key distinction between the two is that unlike actions, behaviors are generally not considered to be intentional (Davidson 2001; McCann 1998; Siipi 2008). For example, a farmer intentionally firing live ammunition at or around a flock of birds would be considered by most to be an *action* whereas a falcon pursuing a bird would be considered a *behavior*. Most would agree that the former involves a more intentional thought process than the latter. It should be noted that there is still a fair amount of debate within the philosophical community concerning the definition of “intentional,” though Siipi suggests, “intentionality implies purposefulness and deliberateness” (2008, p. 234).

Even if one argued that both the farmer and the bird of prey were completing actions, we would point to the difference between actions due to biology and actions due to culture. In the above case, the farmer/pest relationship is a cultural construct resulting from the advent of agriculture. It therefore lies on the “socially-based” side of the spectrum. The predator/prey

relationship between a falcon and a sparrow lies on the “biologically-based” side of the spectrum and would likely be considered to be more natural as a result.

Though legal, official, and academic definitions of naturalness are certainly necessary, consumer perceptions are just as, if not more, important in the realms of food production, distribution, and retail. People tend to view concepts such as naturalness subjectively, initially relying on what Thompson (2011, p. 166) refers to as “culturally based feelings” to form an opinion before incorporating scientific and/or academic arguments that support those feelings (Haidt 2001, 2007). Based upon the power of these initial opinions, marketing the fact that a farmer chooses to utilize agricultural methods considered to be more natural by consumers (and appealing to a sentimental pastoral ideal in the process) could lead to a more desirable product.

Considering both the literature indicating that consumers are willing to pay price premiums for organic food (Batte et al. 2007; Krystallis and Chrysosoidis 2005; Tagbata and Sirieix 2008) as well as the comments within our focus groups, it appears possible that some consumers would be willing to pay a price premium for fruit grown utilizing more natural bird control methods. To further examine this possibility, we conducted additional research focusing on consumer willingness to pay for natural bird control methods, through the use of conjoint surveys and experimental auctions (see Chapter 3). Even with these methods, however, the results should be interpreted with caution, as stated interests may be inflated due to social desirability bias (Vermeir and Verbeke 2006). It is also important to emphasize that this higher willingness to pay is likely only applicable to niche and not to mainstream markets.

CHAPTER 3

Additional Results and Implications

Introduction

As discussed in the introduction chapter of this thesis, a national, online survey and four experimental auctions were conducted in addition to focus groups. Below, I summarize and discuss the results of the survey. In order to strengthen the findings of the survey, experimental auctions were also conducted. Unfortunately, we fell well short of our goal of 100 participants and were unable to collect statistically significant data as a result (recommendations for possible adjustments to the design of future auctions are discussed below). Future research utilizing experimental auctions in order to determine consumer willingness to pay for natural agricultural practices (including but not limited to bird damage-control methods) could be useful and add to these findings.

Web-based survey

Using the information gathered from the focus groups, a web-based national survey was created using Qualtrics, an online survey building tool. The survey consisted of two sections. The first section utilized a choice-based conjoint format. In this format, survey respondents were presented with several purchasing options (in this case three). While considering purchasing options, respondents made tradeoffs based on three product attributes: price, method used during cultivation, and whether or not the fruit was locally grown. The second section included demographic questions, as well as additional questions designed to aid in our understanding of consumer perceptions of various bird damage-control methods. This included two ranking

questions, one in which participants were asked to rank eight methods in order of preference, and another in which participants were asked to rank the three product attributes (price, method, and local versus non-local) in order of importance. The survey questions were pretested with 10 graduate students in order to increase validity, reliability and question clarity. Following pretests, 1000 consumers selected by Qualtrics completed the survey. Through the use of quotas, the demographics of gender, ethnicity, and income were all nationally representative within the sample. The data were analyzed with LIMDEP and SPSS software.

Advantages and disadvantages of the online survey format

There are several advantages to conducting a online survey rather than a phone or mail survey. First, data collection and analysis are faster and easier, as the data itself can be entered directly into spreadsheets and statistical programs. Second, the online format enabled us to administer four versions of the survey, allowing for more statistical power. Third, color photographs of the fruit in question could be used, in order to reduce participant confusion.

Several disadvantages exist with the online survey format as well. Though the number of individuals with access to the Internet continues to grow, concerns remain that certain demographics may be underrepresented in the online survey format—although a study conducted by Fleming and Bowden (2009) found no significant differences in age, gender, ethnicity, and income when comparing respondents to an online survey with respondents to a mail survey. Additionally, the use of quotas in our survey was expected to partially address ethnicity, gender, and income biases. Another issue with online surveys is that some respondents may be more computer-savvy than others (Dillman 2000; Vaske 2008), meaning that certain individuals

completing the survey may be more likely to commit errors that they would not make if the survey was administered in a paper format.

The choice-based conjoint format was especially appropriate for this research due to the fact that it allowed respondents to choose from a number of purchasing options, just as they would in a marketplace setting (Lusk and Hudson 2004). The conjoint format is also advantageous in situations involving ethical consumption as it helps to minimize social desirability bias (De Pelsmacker et al. 2005; Tagbata and Sirieix 2008).

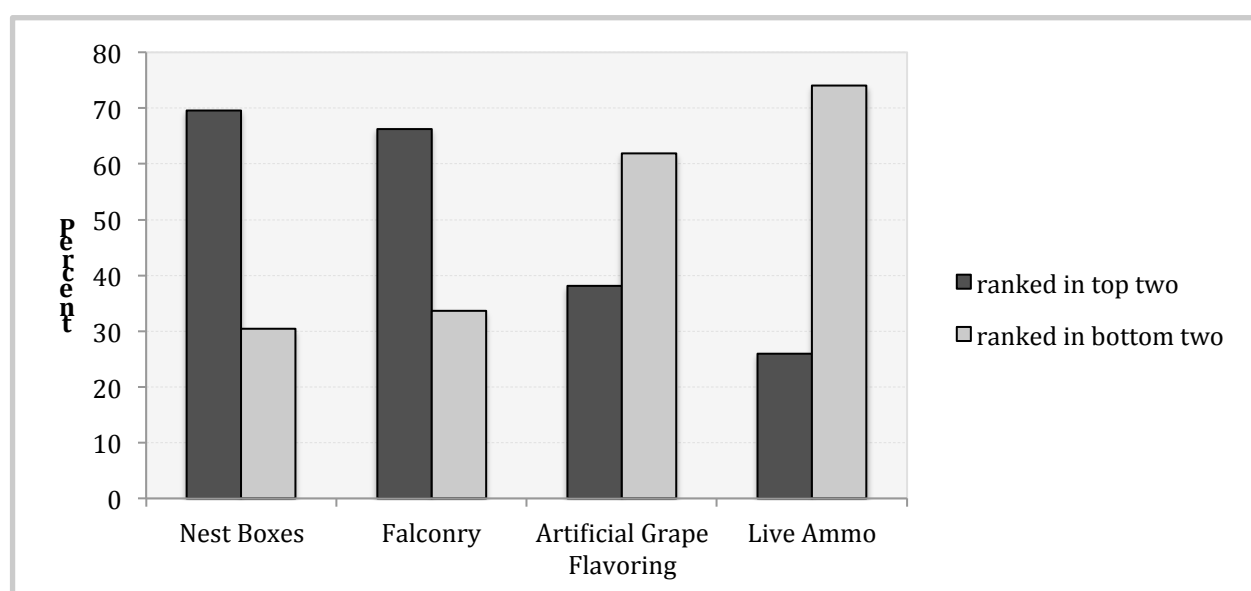
It should be noted, however, that there are a number of limitations to measuring willingness to pay with a survey. One issue is the possibility of hypothetical bias, which is the tendency for participants to inflate their individual willingness to pay due to the lack of budget constraints that are present in the real world (Bishop and Heberlein 1979; Buzby et al. 1998). Hypothetical bias may not be as large of an issue in a choice-based conjoint format, however. A number of studies have found hypothetical responses to questions presented in a choice-based conjoint format to be similar to revealed preferences (Adamowicz et al. 1997; Lusk and Hudson 2004; Lusk and Schroeder 2004). Another disadvantage of this format is that participant responses may be inconsistent and/or influenced by the complexity of conjoint-style questions (DeShazo and Fermo 2002; Lusk and Hudson 2004; Swait and Adamowicz 2001).

Which bird damage-control techniques do consumers prefer?

The survey also allowed us to determine which techniques consumers preferred, and to learn more about what issues related to bird damage control techniques consumers consider while purchasing fruit. I discuss these topics below.

We included a survey question directing respondents to rank the four techniques that elicited the strongest reactions (positive or negative) in the focus groups in order to better determine which bird damage-control methods consumers preferred. This ranking exercise yielded results similar to those gained from the focus group data, with respondents tending to prefer nest boxes and falconry to artificial grape flavoring and live ammunition.

Figure 1: Respondent rankings (in percentages) of 4 bird damage-control methods (n=1,000)



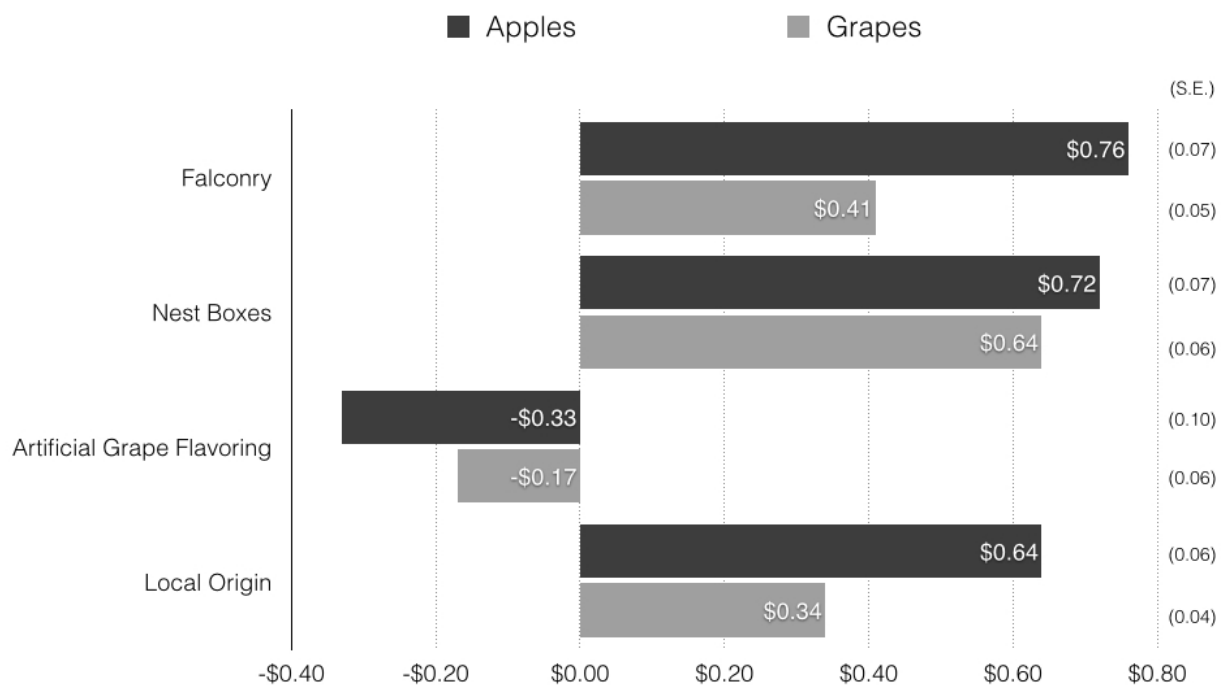
As Figure 1 illustrates, nearly 70 percent of respondents named nest boxes as their most preferred or second most preferred technique while 66 percent ranked falconry as their most preferred or second most preferred technique. Only 38 percent of respondents ranked grape flavoring in their top two, while 26 percent ranked live ammunition this highly.

Consumer willingness to pay for apples and grapes grown using certain bird control methods

Analysis of the survey data provided additional information that may be of use to practitioners. For instance, the survey data allowed us to estimate consumers' willingness to pay for apples and

grapes grown using the bird damage-control methods that elicited the strongest reactions during focus group discussions (falconry, nest boxes, artificial grape flavoring, and live ammunition). Survey respondents indicated they would pay an average of 41 to 76 cents more for fruit grown using falconry and nest boxes as damage control methods when compared to fruit grown using live ammunition. Figure 2 shows willingness to pay results for both apples and grapes.

Figure 2: Survey respondent willingness to pay amounts for attributes compared to reference fruit (i.e. bird management-practice of live ammunition, and geographic origin that is non-local (n=1,000)

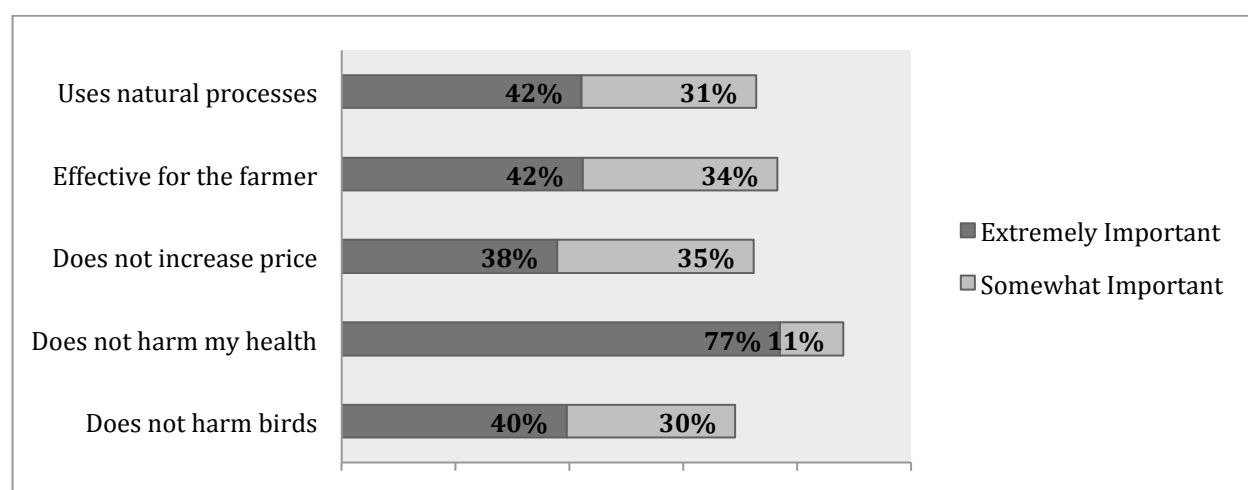


Which issues pertaining to bird damage to fruit were most important to consumers?

To determine which issues pertaining to controlling bird damage to fruit were most important to respondents, we asked, “When considering practices used to control bird damage, how important are the following when making fruit purchases?” We chose five issues identified as important in all focus groups to include as items in the survey: (1) the method does not harm birds, (2) the

method does not harm my health, (3) the method does not increase the price of fruit, (4) the method is effective for the farmer, (5) the method uses natural (non-human) processes. Respondents rated the importance of the above items on a 5-point scale from “extremely important,” to “extremely unimportant” (see figure 3).

Figure 3: Percent of respondents identifying the following items pertaining to practices used to control bird damage as “extremely important” or “somewhat important” when making fruit purchases (n=1,000)



A majority of respondents identified all 5 items as either extremely or somewhat important, with 70 percent identifying “not harming birds,” 73 percent identifying “the use of natural processes,” and 73 percent identifying “not increasing the price” as being somewhat important or extremely important factors in their purchasing decisions. Interestingly, 88 percent of survey respondents identified personal health as somewhat or extremely important, with 77 percent categorizing it as extremely important. This idea that many consumers strongly factor a concern for personal health into food purchasing was prevalent in both the focus group and

survey data, and appears to support previous findings (Curtis 2014; Grunert, 2005; Wognum et al. 2011).

Respondent interest in falconry as a bird damage-control method

As mentioned above, focus group participants exhibited a fair amount of excitement about the use of falconry as a bird damage-control method. A number of participants made comments indicating an interest in visiting a farm utilizing falconry in order to watch the falcon at work:

I wouldn't mind actually going to a farm—a fruit farm on harvest time and watch them work the falcon. It would be another thing to draw people into the farm.

This participant indicated an interest in watching falconry, as well as a desire to purchase fruit from the orchard.

I would go there and watch! And I would probably buy produce while I was there.

Survey respondents also indicated an interest in falconry, with 26 percent reporting to be “very interested” in watching falconry on a farm, and 58 percent being “somewhat” or “very interested.” Of those who indicated an interest in falconry (n=584), 13 percent indicated an interest in visiting a farm to watch falconry more than twice a year. Due to the interest in falconry displayed by both focus group participants and survey respondents, we decided to examine whether interest in falconry could be predicted through any specific behaviors and/or demographics.

Table 3: Logistic regression model predicting which individuals indicated being *very likely* to go to a fruit orchard to watch falconry (n=1,000)

	Exp(B) (odds ratio)	B (coefficient)	S.E.
Gender			
Women (default)			
Men	1.204	0.186	0.155
Age			
Years (continuous)	1.009	0.009	0.005
Ethnicity			
White (default)			
African American	0.968	-0.032	0.217
Hispanic	1.078	0.075	0.287
Other	0.657	-0.420	0.325
Education			
High School or less (default)			
Some college	0.724	-0.323	0.198
Bachelor's degree	0.503	-0.688	0.235*
Masters or above	0.761	-0.274	0.273
Income			
\$25,000 or below (default)			
\$25,000-\$74,999	1.291	0.256	0.204
\$75,000 or above	1.585	0.461	0.225*
Organic purchasing behaviors			
Buy organic less than weekly (default)			
Buy organic at least weekly	3.214	1.168	0.173***

* = $p < .05$, *** = $p < .001$

Table 3 shows logistic regression results predicting which individuals indicated being *very likely* to go to a fruit orchard to watch falconry. Organic purchasing behavior was the most powerful predictor in the model, with individuals who reported purchasing organic food on at least a weekly basis being significantly more likely to indicate an interest in watching falconry at a fruit orchard ($p < .001$). Controlling for the other variables in the analysis, these individuals were over three times more likely to be interested in visiting a fruit farm to watch falconry. High-income respondents were also significantly more likely ($p < .05$) to express an interest in visiting a fruit orchard to watch falconry, with those in the highest income category being 1.5 times more

likely to indicate being *very likely* to watch falconry when controlling for the other variables in the analysis. Less educated respondents also showed more interest in watching falconry, with college graduates being about half as likely to express interest as individuals with a high school diploma or less ($p < .05$). Results also indicated that men are more likely than women to express interest in watching falconry. Though the above results regarding gender do not meet conventional cutoffs of statistical significance, it is worth noting due to the greater enthusiasm for falconry displayed by male focus group participants. Neither age nor ethnicity was strongly associated with an interest in watching falconry at an orchard.

The above focus group and survey data suggests that the use of falconry on a fruit orchard could present an ecotourism opportunity. Promoting falconry as a unique and exciting attraction could draw consumers who might otherwise be uninterested in visiting an orchard, though additional research (especially that of a non-hypothetical nature) is needed to better determine whether this apparent interest in falconry could translate to increased ecotourism.

Experimental auctions

After completing the focus group and survey phases of the project, we conducted a series of four second-price experimental auctions in order to measure consumer willingness to pay for specific bird damage-control methods in a more realistic setting. Due to evidence that consumers behave differently in hypothetical and real conditions, experimental auctions have become a popular method of nonmarket valuation (Lusk and Hudson 2004). Auction participants were recruited in person at a Lansing area farmers market, a natural food store, the East Lansing Department of Motor Vehicles, and via Craigslist, the online bulletin board. Participants were provided \$20 with which to bid on Honeycrisp apples and red seedless grapes grown using one of the

following bird damage-control methods: falconry, artificial grape flavoring, nest boxes, or live ammunition. These were selected because consumers reacted most strongly towards them in focus group and survey questioning. A fifth option was also included in which none of the above methods were used. Red seedless grapes and Honeycrisp apples were chosen as the test fruits due to their availability at the time of the auctions.

Upon arrival, participants were asked to fill out a written survey in order to obtain basic demographic information and fruit purchasing habits. Participants were then provided a brief explanation of the eight methods, described as neutrally as possible, with input from experts in this field (see Table 2). A practice auction using bottled water was conducted prior to the fruit auctions in order to help participants become familiar with the auction process. Participants then bid in two auctions: one featuring Honeycrisp apples and one featuring red seedless grapes. For each auction, five one-pound bags of fruit were displayed, each labeled with one of the four bird damage-control methods and the fifth labeled as “regular” to indicate that none of the methods discussed were used. Participants were instructed to indicate the most that they would be willing to pay for each of the five bags. Three rounds were conducted for each auction. After each round, the bids were ranked from highest to lowest and the participants were shown the second highest bid. Upon completion of the bidding process, I chose a binding round and a binding bag of fruit using a random number generator. Once the binding round and bag were determined, the winning bidder paid the second highest bid from the binding round in exchange for the binding bag of fruit.

We had hoped to secure between 20 and 25 participants for each of the four auctions, however actual recruitment numbers fell far below that goal, leading to overall sample sizes that were too small to yield significant results. After reflecting on our auction design, I have three

suggestions for future auctions. First, raise the \$20 incentive. During the recruiting process, a number of individuals expressed interest in participating but felt that the incentive was too little considering the time involved. Second, conduct on-site auctions. Conducting auctions in an artificial setting (as we did by conducting the auctions in a conference room) rather than a setting where purchases are normally made likely influenced willingness to pay bids (Lusk and Fox 2003; Lusk and Hudson 2004). Third, consider adopting an auction design where it is not necessary for participants to bid against each other. This type of design could take place in a more realistic setting, such as a farmers market or grocery store. It would also likely make it easier to convince individuals to participate since the auction could take place immediately and not require a separate trip and an additional time commitment. It should be noted however, that an auction of this type would require a higher number of participants in order to achieve conventional cutoffs of statistical significance.

Conclusions

Eco-labeling implications

One interesting aspect of this study is the implications it raises in the realm of eco-labeling. Eco-labels are a popular way to identify products that possess extrinsic (or process) attributes dealing with animal welfare, environmental impact, or human rights. The use of eco-labels as a means to convey specific production information to the consumer has increased in popularity and prevalence over the past decade (Howard and Allen 2010; Thøgersen et al. 2010).

Knowledge gained from all phases of this study as well as from previous studies showing consumers to have a preference for a label designating food products as local, organic, or humane (Howard and Allen 2006; Howard and Allen 2010; Loureiro et al. 2001; Spaniolo 2011)

as well as environmentally friendly (Loureiro and Lotade 2005) suggest that further investigation into the creation of a third-party certified eco-label focusing on popular agricultural management practices could be desirable for producers, retailers, and consumers. A number of focus group participants expressed interest in the idea of an eco-label that included information about bird management practices. While incorporating bird and/or agricultural management practices into an eco-label is beyond the scope of this particular project, it is important to note that findings from the focus group and survey phases could support and inform the creation of such a label in the future. The knowledge gained through this research regarding consumer preferences for bird management practices could also be used to strengthen existing “wildlife-friendly” eco-labels, increasing appeal to a broader group of consumers.

Implications for political consumers

This study also has broader implications for political consumers. A number of focus group participants commented that access to information regarding bird control methods employed by fruit growers could influence their purchasing decisions. While discussing falconry, one participant indicated that he/she would purchase fruit grown using falconry if given the choice:

I think...if a label were to say “this fruit was protected by falcons” I would be like “that’s awesome!” I would be like “Hell yeah, you’re worth the extra 50 cents, I’m buyin’ it.”

Comments such as the above must be taken with caution, however, as it is difficult to determine whether or not an individual would follow through with this type of purchasing decision in a genuine shopping situation. Interestingly, participants also expressed a desire to avoid

purchasing products grown using bird control methods of which they disapproved. For example, in a different focus group, an individual stated that they would avoid purchasing fruit grown using falconry if fruit grown using other methods was available:

I: Would you be less likely to buy fruit if you knew that it was—

P: If I had the option of buying fruit between a farmer who used [falconry] and the predit—predatory call? Yeah, absolutely it would.

I: And it would be...you would purchase the distress call—

P: Yes. Correct.

Of course, practicing political consumerism was not important to all participants. Many individuals commented that they would not care which bird control methods were utilized to grow fruit, and that this information would not factor into purchasing decisions.

General conclusions

Consumers have demonstrated a desire for foods produced utilizing agricultural methods that they perceive to be more natural. Though consumer perceptions of naturalness regarding the processing of food have been well documented, less is known about their perceptions of natural when considering agricultural and food production practices. In our analysis of focus group discussions centering around bird damage-control methods employed by fruit farmers, participants strongly preferred bird control methods they perceived to be more natural to those perceived to be less natural. Additionally, the degree of a method's naturalness was closely aligned with acceptance of the method. However, focus group participants did not describe those methods that were viewed neutrally in natural/unnatural terms. Their definitions of natural

tended to focus on harmony and the degree of human intervention involved in the method. This suggests that additional research to determine common consumer perceptions of naturalness is necessary.

Breaking agricultural methods down into their components and considering whether those components are action-oriented (premeditated and intentional) or behavior-oriented (instinctual and based on reflex) can be useful in the analysis of consumer perceptions of agricultural methods (Davidson 2001; McCann 1998; Siipi 2008). Awareness of the differences between “actions” and “behaviors” may help identify and explain the values underlying consumer perceptions of those methods.

Further research addressing consumer perceptions of naturalness when it comes to agricultural and food production practices could benefit all of the actors within the current food system. Reaching out to producers with this information could inform decisions to change or maintain their current production practices, in turn allowing them to provide consumers with a more desirable product. Consumers might benefit through more informed decision-making, and experiencing decreased frustration and confusion while shopping, while retailers could benefit through increased customer satisfaction. This decrease in customer confusion and increase in satisfaction could result in increased sales, as well as a more rewarding overall shopping experience for the consumer.

APPENDICES

Appendix A: Written survey for focus group participants (administered as an entrance survey)

1. What year were you born? _____
2. What is your gender? (circle one) Male Female
3. What is the highest grade or educational degree you completed? _____
4. What is your race or ethnicity? _____
5. How many people, including yourself, live in your household? _____
6. How many children under 18 years old live in your household? _____
7. How often do you buy the following fruits?
 - a. Apples ___ Weekly ___ Monthly ___ Infrequently ___ Never
 - b. Blueberries ___ Weekly ___ Monthly ___ Infrequently ___ Never
 - c. Cherries ___ Weekly ___ Monthly ___ Infrequently ___ Never
 - d. Grapes ___ Weekly ___ Monthly ___ Infrequently ___ Never
8. Are you employed? (circle all that apply)
full time part time student homemaker not employed
9. What was your approximate total gross family income in 2011? (circle one)
 - a. Less than \$20,000
 - b. \$20,000-\$40,000
 - c. \$40,000-60,000
 - d. \$60,000-100,000
 - e. \$100,000 or more

Appendix B: Focus group question route

Researchers at Michigan State University are conducting a study investigating consumer preferences for various bird damage-control techniques used by fruit farmers. The purpose of this research is to better understand consumers' perceptions of these techniques, and to pass the results on to produce growers. Now I am going to ask you about a number of techniques farmers use to keep birds from eating their fruit crops. Please keep in mind that we just want to know what you think. There are no right or wrong answers.

1. Where do you typically shop to buy fruit?
2. Some farmers use sound to frighten birds through the use of propane-fired cannons or firing blanks from a gun. What are your thoughts on this technique?
3. Some farmers fire guns with live ammunition at flocks of birds to kill a few and frighten the rest. What are your thoughts on this technique?
4. Some farmers use recorded bird distress calls or predator calls to keep birds away. What are your thoughts on this technique?
5. Some farmers spray non-toxic substances, such as artificial grape flavor directly onto fruit crops to repel birds (birds may not like the taste or have trouble digesting the substance). What are your thoughts on this technique?
6. Some farmers use netting to prevent birds from getting near enough to eat fruit crops. What are your thoughts on this technique?
7. Some farmers use visual scare devices, such as fake plastic hawks, or streamers made from plastic or polyester, to keep birds away from their fruit crops. What are your thoughts on this technique?
8. Some farmers place nest boxes near their fruit crops to attract birds of prey to perch in that area (they may kill or scare birds that eat fruit). What are your thoughts on this technique?
9. Some farmers will hire someone to fly a trained falcon on the farm to frighten birds away from fruit crops. What are your thoughts on this technique?
10. What has been the most important topic that we've discussed this evening?
11. Is there anything that we should have talked about but didn't?
12. How much information about these techniques would you want on a product label?
13. What kind of information do you not need to know when it comes to the food you purchase?

Appendix C: Online survey

Figure 4: Online survey

Consent

You are being asked to participate in a research study conducted by Michigan State University. We are investigating consumer perceptions of bird damage-control techniques used on fruit crops. The purpose of the research is to better understand how people view various bird damage-control techniques. Information gathered from this survey may help farmers select fruit growing practices that are preferred by consumers.

This survey should take about 15 minutes. Your answers will be completely anonymous. Participation in this research project is completely voluntary. You have the right to say no. You may choose not to answer specific questions or to stop participating at any time. If you have any concerns or questions about this study, please contact Phil Howard, Associate Professor, Michigan State University (howardp@msu.edu or 517-355-8431).

☐ I voluntarily agree to participate in this survey

Are you of Hispanic descent?

☐ Yes

☐ No

Which income category includes your gross household income from 2012?

☐ Under \$25,000

☐ \$25,000 - \$49,999

☐ \$50,000 - \$74,999

☐ \$75,000 - \$99,999

☐ \$100,000 - \$149,999

☐ \$150,000 - \$199,999

☐ \$200,000+

Fruit Purchasing Habits

1) How often do you buy the following fruits?

	Weekly	Monthly	Infrequently	Never
Apples	☐	☐	☐	☐
Blueberries	☐	☐	☐	☐
Cherries	☐	☐	☐	☐
Grapes	☐	☐	☐	☐

Conjoint--Apples

For questions 2 through 5, imagine you are buying **Honeycrisp apples** from your local retailer in the month of October. These questions offer two types of apples that differ from each other in at least one way.

Please carefully read the descriptions below. If there is a factor not mentioned (e.g., appearance, taste), assume

it would be the same in each description, and only consider the differences between the choices listed.

Technique - The technique used by a fruit farmer to minimize damage to fruit caused by certain types of birds

Falconry— Hiring someone to fly a trained falcon on the farm to frighten birds away from fruit crops.

The falcons may also occasionally kill a bird.

Artificial Grape Flavoring—Spraying artificial grape flavor, a common food additive called Methyl Anthranilate, directly onto the fruit crops to repel birds

Nest Boxes—Placing nest boxes near their fruit crops to attract birds of prey to perch in that area.

These birds of prey may kill or scare the birds eating the fruit.

Live Ammunition — Firing guns with live ammunition at flocks of birds to kill a few and frighten the rest

Geographic Origin - The geographic origin of the fruit

Local—The fruit was grown within 100 miles of the location in which it was purchased

Non-Local—The fruit was grown more than 100 miles from the location in which the fruit was purchased

Price - price per pound (according to the USDA, the national average price for Honeycrisp apples in October 2012 was \$2.38)

After comparing each description, select the apple you would prefer to buy. If you do not like either type of apple, check “I would not choose either option.”



2) Suppose that you could only choose from the apples below. Which would you prefer? (check only one)

	Apple A	Apple B	
Technique	Artificial Grape Flavoring	Nest Boxes	
Geographic Origin	Local	Local	I would not choose either option
Price	\$2.62 per Pound	\$2.86 per pound	
	☐	☐	☐



3) Suppose that you could only choose from the apples below. Which would you prefer? (check only one)

	Apple A	Apple B	
Technique	Artificial Grape Flavoring	Live Ammunition	
Geographic Origin	Non-Local	Non-Local	I would not choose either option
Price	\$2.38 per pound	\$2.62 per pound	
	☐	☐	☐



4) Suppose that you could only choose from the apples below. Which would you prefer? (check only one)

	Apple A	Apple B	
Technique	Live Ammunition	Artificial Grape Flavoring	
Geographic Origin	Local	Local	I would not choose either option
Price	\$2.86 per pound	\$2.62 per pound	
	☐	☐	☐



5) Suppose that you could only choose from the apples below. Which would you prefer? (check only one)

	Apple A	Apple B	
Technique	Nest Boxes	Artificial Grape Flavoring	
Geographic Origin	Non-Local	Non-Local	I would not choose either option
Price	\$2.62 per pound	\$2.38 per pound	
	☐	☐	☐



6) Please identify the product attributes that you considered each time you made your decision. (check all that apply)

- ☐ Technique
- ☐ Geographic Origin
- ☐ Price
- ☐ I considered all product attributes while making my decision

Conjoint--Grapes

For questions 7 through 10, imagine you are buying **red seedless grapes** from your local retailer in the month of October. These questions offer two types of grapes that differ from each other in at least one way.

The descriptions below are the same as in the previous section, except for the average price per pound. If there is a factor not mentioned (e.g., appearance, taste), assume it would be the same in each description, and only consider the differences between the choices listed.

Technique - The technique used by a fruit farmer to minimize damage to fruit caused by certain types of birds

Falconry— Hiring someone to fly a trained falcon on the farm to frighten birds away from fruit crops.

The falcons may also occasionally kill a bird.

Artificial Grape Flavoring—Spraying artificial grape flavor, a common food additive called Methyl Anthranilate, directly onto the fruit crops to repel birds

Nest Boxes—Placing nest boxes near their fruit crops to attract birds of prey to perch in that area. These birds of prey may kill or scare the birds eating the fruit.

Live Ammunition — Firing guns with live ammunition at flocks of birds to kill a few and frighten the rest

Geographic Origin - The geographic origin of the fruit

Local—The fruit was grown within 100 miles of the location in which it was purchased

Non-Local—The fruit was grown more than 100 miles from the location in which the fruit was purchased

Price - price per pound (according to the USDA, the national average price for red seedless grapes in October 2012 was \$1.84)

After comparing each description, select the grapes you would prefer to buy. If you do not like either type of grapes, check "I would not choose either option."



7) Suppose that you could only choose from the grapes below. Which would you prefer? (check only one)

	Grape A	Grape B	
Technique	Nest Boxes	Falconry	
Geographic Origin	Local	Non-Local	
Price	\$1.84 per pound	\$2.21 per pound	
	☐	☐	☐ I would not choose either option



8) Suppose that you could only choose from the grapes below. Which would you prefer? (check only one)

	Grape A	Grape B	
Technique	Artificial Grape Flavoring	Live Ammunition	
Geographic Origin	Non-Local	Local	
Price	\$1.84 per pound	\$1.84 per pound	
	☐	☐	☐ I would not choose either option



9) Suppose that you could only choose from the grapes below. Which would you prefer? (check only one)

	Grape A	Grape B	
Technique	Live Ammunition	Live Ammunition	
Geographic Origin	Local	Non-Local	
Price	\$2.21 per pound	\$2.02 per pound	I would not choose either option
	☐	☐	☐



10) Suppose that you could only choose from the grapes below. Which would you prefer? (check only one)

	Grape A	Grape B	
Technique	Nest Boxes	Nest Boxes	
Geographic Origin	Non-Local	Local	
Price	\$1.56 per pound	\$2.02 per pound	I would not choose either option
	☐	☐	☐



11) Please identify the product attributes that you considered each time you made your decision. (check all that apply)

- ☐ Technique
- ☐ Geographic Origin
- ☐ Price
- ☐ I considered all product attributes while making my decision

Fruit Questions

12) Please rank the following bird damage-control techniques in order of preference from 1 (most liked) to 4 (least liked).

- ☐ Artificial Grape Flavoring
- ☐ Falconry
- ☐ Live Ammunition
- ☐ Nest Boxes

13) When considering practices used to control bird damage, how important are the following when making fruit purchases?

	Extremely Unimportant	Somewhat Unimportant	Neither Important nor Unimportant	Somewhat Important	Extremely Important
Does not harm birds	☐	☐	☐	☐	☐
Does not harm my health	☐	☐	☐	☐	☐
Does not increase price of fruit	☐	☐	☐	☐	☐
Is effective for the farmer	☐	☐	☐	☐	☐
Uses natural (non-human) processes	☐	☐	☐	☐	☐

14a) Some farms allow people to watch when a falcon flies over fruit crops to frighten other birds away. How interested would you be in visiting a farm to watch falconry?

- Very Uninterested Somewhat Uninterested Neither Interested nor Uninterested Somewhat Interested Very Interested
- ☐ ☐ ☐ ☐ ☐

14b) How often would you visit a farm to watch falconry?

- Once a year Twice a year More than twice a year Never
- ☐ ☐ ☐ ☐

15) How often do you buy organic fruit?

- At least weekly At least monthly At least once a year Never
- ☐ ☐ ☐ ☐

Demographic Questions

16) In what year were you born?

17) What is your gender?

- Male Female
- ☐ ☐

18) What is your primary ethnicity?

- ☐ White/Caucasian
- ☐ African American
- ☐ Hispanic
- ☐ Asian
- ☐ Native American
- ☐ Pacific Islander
- ☐ Other

19) What is the highest level of education you have completed (please choose one)?

- ☐ Less than High School
- ☐ High School / GED
- ☐ Some College
- ☐ 2-year College Degree
- ☐ 4-year College Degree
- ☐ Master's Degree
- ☐ Doctoral/Professional Degree (PhD, JD, MD)

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