

The effects of information about price anchoring: Evidence from a choice experiment

Scott Lemos^{1*} , John M. Halstead²  and Ju-Chin Huang³

¹Department of Management, University of New Hampshire, Durham, NH, USA, ²Department of Natural Resources and the Environment, University of New Hampshire, Durham, USA and ³Department of Economics, University of New Hampshire, Durham, USA

*Corresponding author. Email: scott.lemos@unh.edu

(Received 11 June 2021; revised 16 May 2022; accepted 17 May 2022; first published online 13 June 2022)

Abstract

This study details the results of an experimental intervention designed to address the issue of price anchoring in the choice experiment framework. The intervention, which informs respondents of the tendency to anchor choices on potentially arbitrary pieces of information, is applied to a choice experiment used to examine consumers' willingness to pay for local and/or organic tomatoes in Northern New England and develops three primary contributions. First, evidence from this study shows that anchoring effects are present. Second, providing information to consumers plays a mitigating role on these effects; price anchoring changes willing to pay estimates between 44% and 51% and exposure to anchoring-specific cheap talk is associated with a reduction in these anchoring effects between 60% and 80%. These results are explained through decreases in price sensitivity induced by increasing the mean price vector and subsequent increases in price sensitivity due to the information intervention. Finally, this study reveals that consumers are willing to pay a substantial price premium for locally grown tomatoes, from \$0.96 to \$1.12 per pound, offering some guidance for policy regarding growing practice and farm land use as regional coalitions support local agriculture expansion in the Northeast.

Keywords: anchoring; choice experiment; information; local agriculture; organic agriculture

Introduction

A body of evidence has emerged over the last three decades suggesting that consumer behavior may not be entirely consistent with the axioms of neoclassical economic theory, where, for example, behavior can often be characterized by a large degree of arbitrariness. Implications from this work therefore challenge the central premise of welfare economics, that choices reveal preferences, and rather suggest preferences are subject to the vagaries of the environment in which they are observed (Lichtenstein and Slovic 2006). One of the most studied sources of arbitrariness comes from the undue influence of normatively irrelevant cues, termed “anchors” in the seminal work of Tversky and Kahneman (1974).

When “anchoring” occurs, a decision maker uses an otherwise arbitrary piece of information to inform future judgments or choices.¹ In the influential work of Ariely, Loewenstein, and Prelec (2003), arbitrary anchors such as the last two digits of an individual’s social-security number are shown to have a large influence on the amount these same individuals are willing to pay (WTP) for common household items. Similar anchoring effects have been reported across a variety of decision-making domains, including in the formation of risk perceptions, value judgements, and probability estimates. (Tufano 2010; Alevy et al. 2011; Fudenberg et al. 2012; Sugden et al. 2013)

Within the stated-preference valuation field, the anchoring phenomenon has been particularly troublesome. Research in this field attempts to generate welfare estimates, i.e. willingness to pay/willingness to accept, by casting survey respondents as decision-making agents in hypothetical market settings, forcing choice over a set of substitute products that vary by product-level attributes. Within this context, the researcher is required to specify the product and the attributes that define that product, a simple example of which is price. Varying the levels of these attributes is ideally informed systematically in survey pretesting, though it is still a somewhat subjective and arbitrary choice on the behalf of the researcher. Therefore, as respondents are using this information to make decisions, the information gathered from their choices is potentially arbitrary as well, possibly reducing the usefulness of derived welfare estimates from a policy perspective.

To understand anchoring in this context, consider that respondents to a stated-preference survey might perceive some initial price presented within the survey instrument as conveying information about the “true” value of the product. If these respondents allow arbitrary variations in these prices to influence their choices within the context of the survey instrument, then willingness to pay estimates derived in this framework may be considered biased. Several studies have examined the effects of anchoring bias in contingent valuation studies (Alberini et al. 2005; Boyle et al. 1985; Cameron and Quiggin 1994; Chien et al. 2005; Herriges and Shogren 1996; Whitehead 2002) and have, in general, concluded that individuals’ derived welfare estimates are sensitive to both survey price scale and range.

A number of studies have also examined the effects of anchoring in the choice experiment (CE) framework and results are largely mixed. Within this literature, numerous studies have found under experimental conditions that varying the price level in choice experiments has effects on preference and preference rankings, as well as second-order effects on WTP estimates (see Carlsson, Frykblom, and Lagerkvist (2007); Carlsson and Martinsson (2007); Su et al. (2017); Morkbak, Christensen, and Gyrð-Hansen (2010); Ladenburg and Olsen (2008); and Glenk et al. (2019)). Though, in contrast, Hanley et al. (2005); Frykblom and Shogren (2000); and Ohler et al. (2000) showed that changes in the price vector used in a CE produced no significant effects on preference estimates.

This paper examines anchoring behavior within the context of a choice experiment that was conducted to gather consumer preferences for local and organic tomatoes in Northern New England. Three contributions to related literature are made within this work. First,

¹The notion of anchoring is somewhat connected to the idea of ‘reference points’, which are used in Kahneman and Tversky (1979), in which they build their famous Prospect Theory. Here, we distinguish between ‘anchors’ and ‘points of reference’ according to where they are formed. That is, anchors are arbitrary pieces of information typically formed by an external source, i.e. information presented within a survey, whereas ‘reference points’ are typically formed internally, i.e. a survey respondent’s income, which are used to judge utility losses (gains) as income decreases (increases) and are never able to be completely eliminated in the decision-making process. This paper focuses exclusively on the role of externally generated ‘anchors’.

this study provides further evidence of the existence of anchoring effects in the CE framework. Second, this study proposes an *ex ante* approach to mitigating anchoring effects in the form of an “anchoring information treatment”. This treatment acts as an information supplement for respondents, informing them of the tendency for individuals to anchor on potential arbitrary information and reminding them that the prices presented in the choice experiment do not necessarily reflect the “true” value of the product, or each individual respondents reservation price. Within this intervention, survey respondents are cautioned against anchoring, and thus deviating away from their true preferences, based on the prices presented in each choice set.

Finally, this paper contributes to the literature on local and organic agriculture by estimating consumer willingness to pay for local and organic tomatoes in New Hampshire, Vermont, and Maine. There is a large and growing interest in the economic valuation of local agriculture across the country and both contingent valuation (Loureiro and Hine 2002; Giraud *et al.* 2005; Carpio and Isengildina-Massa 2009) and choice experiments (Darby *et al.* 2008; Adalja *et al.* 2015; Onozaka and McFadden 2011; James *et al.* 2009; Onken *et al.* 2011; Pyburn *et al.* 2016; Werner *et al.* 2019) have produced mixed results in uncovering consumers’ willingness to pay for locally grown food. Focusing on the choice experiment literature in Northern New England, Pyburn *et al.* (2016) and Werner *et al.* (2019) find that consumers in the region are willing to pay premia in the range of 30–55% for locally grown produce, including tomatoes, the product studied here. These findings are consistent with the broader literature studying consumer preferences for local agricultural products (Adams and Salois 2010).

Briefly, results from this analysis show: (1) the presence of anchoring effects in this choice experiment, primarily measured by increases in marginal willingness to pay estimates on the magnitude of 43.9–50.8% when the price vector is doubled; (2) a role for anchoring information treatments in mitigating anchoring effects on the magnitude of 60–80%; and (3) positive consumer preferences for locally grown tomatoes across the New England region, consistent with effect sizes in studies from Pyburn *et al.* (2016) and Werner *et al.* (2019).

The rest of the paper proceeds as follows: “Anchoring effects and the role of information” section discusses anchoring effects and the potential role of information treatments in mitigating these effects, “Experimental Design and Data Summary” section describes the experimental design and summarizes the data, “Modeling Framework and Specification” section details the econometric method, “Results” section presents and discusses the full set of parameter and WTP estimates, and finally, “Conclusions and Discussion” section concludes.

Anchoring effects and the role of information

Anchoring in stated-preference methodology

The notion of anchoring as a decision-making heuristic was first introduced in the psychological literature by Slovic (1967) who studied patterns of preference reversals among bets of varying risk, but the anchoring-and-adjustment heuristic developed in the seminal work of Tversky and Kahneman (1974) has been the workhorse theory for much of the related literature. They propose that anchoring is caused by “insufficient adjustment” away from an initially presented value, i.e. the anchor, and thus starting pieces of information disproportionately influence the choices of decision makers. This assumes that decision makers are influenced primarily by an initial anchor and slowly adjust back to some starting value and has alternatively been termed “starting-point” effects in the resulting literature. Using this theory of anchoring, many studies have illustrated the prevalence of

anchoring in decisions regarding both general knowledge (Epley and Gilovich 2001; McElroy and Dowd 2007; Mussweiler and Strack 1999; Strack and Mussweiler 1997) and probability estimates (Chapman and Johnson 1999; Plous 1989).

An alternative view of the anchoring model is that of selective accessibility, based on the psychological theory of confirmation bias. Here, a decision maker is thought to selectively access information consistent with an anchor, and thus attempt to confirm the hypothesis that some anchor represents the “correct” choice. Compared to the anchoring-and-adjustment heuristic, this suggests that decision makers are primarily influenced not by an initial anchor, but rather by values presented later in the choice process. In this alternative view, the prevalence of anchoring can be expected to increase over the choice process. Chapman and Johnson (1999) and Strack and Mussweiler (1997) provide empirical evidence that selective accessibility is a plausible mechanism for anchoring.

Each of these explanations for anchoring directly contradicts the assumptions of utility maximization, in which individuals’ choices are assumed to reflect their underlying preferences for the product. In the context of a choice experiment, varying the scale and/or range of the price vector should not change individuals’ responses as they are expected to possess exogenously determining valuations for the product that are unaffected by preference elicitation framing. From this perspective, welfare estimates derived from the choice experiment should not be influenced by the set of presented prices.

The prices attached to alternatives in CEs are displayed simultaneously in each choice set. If these prices act as an anchor under which choices are made, then one would expect that, across individuals, the distribution of choices between alternatives in each choice set to differ based on the presented set of prices, holding all other attributes constant. For instance, if the presented prices are high enough relative to a decision maker’s income, then it is possible they find that the price is high enough to make a difference in their choices. Though, if this type of anchoring is present, it is not a priori clear whether the respondent anchors on the highest, lowest, or average prices presented in the choice set, or some other combination of prices and attributes altogether. Within the CE framework, studies examining anchoring have focused on two potential effects: (1) price vector effects; and (2) starting point effects, and results have been mixed.

With regards to price vector effects, individuals are thought to anchor their preferences on the vector of prices used for the price attribute. Within the context of water quality improvements, Hanley et al. (2005) and Frykblom and Shogren (2000) each use an experimental split-sample approach to study price vector effects and find no significant impact of changing the price vector on estimates of preferences or willingness to pay. Further, Ohler et al. (2000) investigate attribute range effects in binary response conjoint analysis tasks in the context of public bus choices and find that varying attribute range impacts preferences to a small degree. On the other hand, using split sample approaches, Carlsson and Martinsson (2007) and Ryan and Wordsworth (2000) find that marginal willingness to pay estimates are sensitive to price vector scale in the context of power outages and cervical screening programs, respectively. Most recently, Su et al. (2017) use a choice experiment to determine WTP for improvements in rice insect control and storage and again find that WTP estimates are sensitive to the price vector presented in the CE.

On the other hand, starting point effects are thought to influence respondent perceptions of prices in subsequent choice sets through the prices used in the first choice. To the author’s knowledge, only two studies examine starting point effects in the CE framework. Carlsson and Martinsson (2007) used a split sample design in which one split was presented with an additional choice set with low prices and large attribute improvements at the beginning of the choice experiment found no presence of starting point bias. Conversely, Ladenburg and Olsen (2008), using a split sample design in which they fix

the prices used in an Instruction Choice Set (ICS) at different levels, find the presence of starting point bias, though the effect is significant only for females.

This study focuses on the effects of varying the price vector on consumer preferences. Following the related literature, we hypothesize that an increase (decrease) in the mean of the price vector would increase (decrease) willingness to pay estimates by decreasing the estimated coefficient on the price variable, in other words, by decreasing price sensitivity. That is, holding all else equal, an increase in the price vector of a choice experiment will decrease the mean marginal disutility of price. Here, we would expect that $|\beta_{p_j,k|LP}| > |\beta_{p_j,k|HP}|$, or the absolute value of the marginal utility on price (p) for attribute j of product k conditional upon receiving the low price vector (LP) will be greater than the absolute value of the marginal utility on price (p) for the same attribute j of the same product k conditional now upon receiving the high price vector (HP). That is, an increase in the price vector of the choice experiment will induce an income and substitution effect, which, within the random utility discrete-choice framework used in this study, has second-order effects on welfare estimates (McFadden 1973). In terms of generating marginal welfare estimates (i.e. WTP), we follow McFadden (1974) who shows that for an individual i is calculated as the negative of the marginal rate of substitution between the attribute (j) and price (p) for a given product (k), or

$$WTP_{i,j,k} = \frac{\frac{\delta U_i}{\delta p_k}}{\frac{\delta U_i}{\delta p_j}} = -\frac{\beta_{j,k}}{\beta_{p,k}} \quad (1)$$

Given (1) and the assumption of an income effect induced by increasing the mean price vector, we can expect that individuals presented with the high price vector will have a higher marginal WTP than individuals presented with the low price vector for the same attribute/product combination. This “anchoring” hypothesis can be expressed according to the null hypothesis $H_0^A : WTP_{i,j,k|LP} > = WTP_{i,j,k|HP}$. Rejection of the null of equal marginal WTP estimates by attribute across price vectors would suggest that an anchoring effect exists.

The role of information in mitigating anchoring effects

In stated-preference valuation studies, respondents make choices contingent on the information provided by the researcher within the survey. This information may influence respondents’ choices within the survey by affecting the probabilities that respondents attach to the occurrence of uncertain benefits, enhancing the credibility of the valuation process or by reducing potential strategic bias. (Munro and Hanley 2001) The literature that examines the effects of information variations within choice experiments and stated-preference methods, more generally, often focus on variations in design dimensions of the survey. For example, some studies examine the effect on valuation outcomes of different design dimensions defined by the number of alternatives, attributes, attribute levels and choice sets (Caussade *et al.* 2005; Hensher 2006). Other studies investigate the effect of differences in choice question formats (Brefle and Rowe 2002), attribute level descriptions (Kragt and Bennett 2012), attribute combinations (Rolfe and Windle 2015), substitute alternatives (Rolfe *et al.* 2002), choice set information visualization (Bateman *et al.* 2009; Hoehn *et al.* 2010; Rid *et al.* 2018; Shr *et al.* 2019) and choice set information display orientation (Sandorf *et al.* 2018). Finally, Aadland *et al.* (2007) examine the effects of information interventions in contingent valuation studies using a Bayesian updating approach

and find interactions between anchoring and an informational prompt regarding hypothetical bias systematically bias willingness to pay estimates.

Within the context of this study, Epley and Gilovich (2005) and LeBoeuf and Shafir (2009) provide the motivation for adapting information treatment prompts aimed at mitigating anchoring effects. Specifically, Epley and Gilovich (2005) provide evidence from two experiments that forewarning respondents of judgmental biases in the form of anchoring diminished the effects of anchoring. Further, LeBoeuf and Shafir (2009) provide evidence that forewarnings of insufficient adjustment away from an initial anchor significantly reduced the effects of respondent anchoring. The anchoring information script used in this study, focusing on decision-making associated with anchoring, represents an additional set of information which can influence respondent choices in the context of the choice exercise (see “Experimental Design and Data Summary” section below for the full script) and is the first attempt at using this approach within the context of a choice experiment.

Within this context, anchoring information is thought of as a “signal”, or vector of information embedded in the survey regarding the presence of anchoring bias. Here, this warning represents a “costless transmission of information” (Cummings and Taylor 1999; p. 650), which the respondent can use, at least partially, to avoid anchoring their responses on information presented within the choice exercise. To note, this additional information may have opposite effects on welfare estimates from both the high price (*HP*) and low price (*LP*) samples, in that it provides no information on the direction of anchoring effects.² This notion is developed further in Aadland and Caplan (2006a) and Aadland et al. (2007), which show issues of over-correction in response to informational cheap talk, and therefore draw into question the efficacy of cheap talk as a reliable *ex ante* tool for mitigating specifically hypothetical bias, and behavioral biases more broadly.

Experimental design and data summary

A survey and choice experiment were designed to elicit consumer preferences for local and organic produce in Northern New England and included three sections: “Introduction” section familiarized the consumer with the products being valued and gathered information on attribute preferences for the target population; “Anchoring Effects and the Role of Information” section presented the choice experiment and a set of related follow-up questions; and “Experimental Design and Data Summary” section gathered a set of socio-economic indicators from each of the survey respondents. For the empirical experiment concerned with testing for anchoring bias and the effectiveness of information scripts on mitigating such bias in a discrete choice framework, the responses to a study collecting individuals’ preferences for local and organic agriculture in Northern New England were analyzed. Here, an online survey is used to compare a treatment group, i.e. anchoring information (INFO) with a neutral control group, i.e. no anchoring information (NoINFO). Formally, the test was carried out by using a split-sample design, in which

²The anchoring-information approach described above should look familiar to some readers, as it is modeled after the cheap-talk approach of Loomis et al. (1994), Cummings and Taylor (2009), and Aadland and Caplan (2006a). Within the non-market valuation literature, cheap talk has been developed and used as an *ex ante* approach for eliminating hypothetical bias in stated preference valuation methods. (Cummings and Taylor 1999) This approach provides an explicit warning about the problem of hypothetical bias and is generally presented prior to the willingness to pay questions in the survey. It is thought that these warnings provide additional information for the respondent to “self-correct” away from biasing responses because of the hypothetical nature of the survey.

the full sample was split along two dimensions: price vector (Low/High) and anchoring information exposure (NoINFO/INFO). The price-vector dimension split the sample according to the level of the price attribute presented for each choice set, where respondents exposed to the high price split were presented with prices double that of those faced with the low price split, as shown in Table 1.

Respondents exposed to survey versions with the anchoring information (INFO) were presented with an identical set of survey questions, but the choice experiment portion of the survey was prefaced with a short script describing the issue of anchoring bias in stated preference valuation techniques. The information script presented to the respondents was as follows:

Experience from previous similar surveys is that in uncertain and hypothetical situations, people often base their responses to questions on easily accessible information. That is, people often anchor their responses to a question based on the first piece of information they see, even though this information might be contrary to their actions in a similar, non-hypothetical situation. Throughout the following section, keep in mind that the price presented for each bundle does not necessarily reflect the actual value you might see in a marketplace. And more importantly, do not consider the proposed bundle prices as the “true” value of the bundle, particularly as they relate to your preferences for the vegetable.³

Based on qualitative information gathered from focus groups of consumers and producers in the region, tomatoes are presented in the choice experiment as being composed of five product attributes, summarized in Table 1 below. The first two attributes are indicators of whether the produce were grown locally or through certified organic practices.⁴ Another indicator describing the method of purchase (i.e. directly from farmers or indirectly from other markets) was included as an attribute and is expected to capture preferences around purchasing convenience, as well as social capital considerations.⁵ Further, Bond *et al.*

³An anonymous reviewer pointed out that the information script used in this experiment might not be fully accessible to many survey respondents as there are additional big words and long sentences necessary to cognitively process the information script, as compared to the neutral script given to those in the control group, as originally suggested in DeShazo and Fermo (2002). This raises concerns of attrition from the survey as respondents in the treatment group have additional difficulty wading through textual material. Though we are unable to provide a precise account of this systematic selection, we did not uncover systematic missing choice responses to subsequent choice experiment questions with different treatments. This would suggest no evidence of systematic missing choice responses due to question complexity. Further, we are able to observe the average time to complete the survey across each the treatment and control groups. Here, the treatment group (i.e. those exposed to the information script) took, on average, 23 minutes to complete the survey, whereas those in the control group took, on average, 21 minutes. Therefore, it is possible that these 2 extra minutes to complete were associated with the time needed to read and comprehend the information script.

⁴“Locally grown” produce was defined as produce grown within a 50 mile radius of where the respondent lives, informed by Brown and Miller (2008) and Werner *et al.* (2019).

⁵According to a helpful comment from a reviewer of this paper, it is important to remember that the price of a product, here tomatoes, is not necessarily the relevant “full price” that a consumer will pay. Rather, as is demonstrated in the revealed preference environmental valuation literature, the full cost of a good also includes travel costs. Within this context, the marginal travel cost for purchases at a supermarket may be small relative to a farmers’ market, especially if the latter do not operate every day of the week or the consumer cannot purchase all of the groceries in this one location.

Table 1. Attributes and attribute levels in choice experiment survey

Attribute	Levels
Locally grown (Yes = 1)	0,1
Certified organically grown (Yes = 1)	0,1
No blemishes or other irregularities (Yes = 1)	0,1
Purchased directly from the farmer (Yes = 1)	0,1
Prices tomatoes (\$)/lb.	
Low	0.91, 1.15, 1.99, 4.49
High	1.82, 2.30, 3.98, 8.98

Tomato Bundle A	Tomato Bundle B
Non-Locally grown	Locally grown
Certified Organically grown	Certified Organically grown
Purchased directly from the farmer (e.g. farmers market)	Purchased indirectly from the farmer (e.g. grocery store)
No blemishes or other irregularities	No blemishes or other irregularities
\$4.49/lb.	\$1.15/lb.

- Bundle A
- Bundle B
- Neither (prefer to stay with your current practice)

Figure 1. Example of choice experiment survey bundle.

(2008) and Brown and Miller (2008) suggest that freshness and quality are the most important attributes for consumers who purchase produce. Thus, to capture the fact that consumers are often forced to make quality judgments based on appearance alone, an attribute indicating if the produce has visual blemishes was included in the experimental design. Finally, price is included to obtain the willingness to pay estimates for each of the non-price attributes.

Among the five attributes detailed in Table 1, four attributes have two levels (Yes/No) and the price attribute takes on four levels. As shown in Figure 1, consumers are asked to make a choice over three bundles of produce, two of which are hypothetical bundles proposed in the choice set, and the third representing their current purchasing habits. An orthogonal main effects design was conducted using the JMP software suite to ensure no interactions between the attributes, as each level of one factor occurs with each level of another factor with equal or at least proportional frequencies. Results from this design technique reduced $2^4 \times 4 = 64$ possible combinations into eight combinations of attributes, which are then split into four versions of the survey with two combinations in each version. Therefore, information is gathered on two choice sets over varying tomatoes for each respondent.

The four versions of the survey are divided into four subsamples: (1) LP/NoINFO; (2) HP/NoINFO; (3)LP/INFO; and (4) HP/INFO, for a total of 16 versions of the survey. The survey questionnaires were created and distributed via the Qualtrics Survey Research Suite, through which a quota-based approach was used to sample from an online panel, where

respondents were screened and filtered according to three criteria: (1) at least 18 years old; (2) the households primary food shopper; and (3) a resident of New Hampshire, Maine, or Vermont. Additionally, respondents who failed a “focus test” were also removed from the analysis.⁶ Details on the development of the survey instrument and the policy background can be found in Pyburn *et al.* (2016). Data collection was handled in 2017 by the Marketing Systems Group⁷, who controls an online panel consisting of members of the general United States public. Respondents were invited via email and due to the sampling scheme, it is not possible to calculate a standard response rate as a quota-based sampling frame was employed. After clearing incomplete responses and non-compliers, 523 respondents remain in the final sample, consisting of 197 respondents from New Hampshire, 202 from Maine, and 124 from Vermont. The proportions of respondents chosen from each state were based on share of population across the three states.

Table 2 presents demographic summary statistics of survey respondents and their associated populations for comparison, by state. Across the full sample, 71.3% of respondents are female, though this percentage is somewhat lower in Vermont (62.9%) and represents a larger proportion of females than their population average of about 50%. The mean age across the sample is about 50 years old, with a standard deviation of 16.3, indicating that the sample has a broad coverage of age groups used in estimation and is roughly consistent with population averages, though the sample in New Hampshire and Vermont are about 7 years older than their population average. The median annual household income across the sample is \$65,033, where this average is higher in VT (\$70,887) and lower in ME (\$58,069), and most likely found in NH (\$68,5489). In terms of educational attainment, 79.6% of respondents have at least some college education and is slightly higher than each of the three states averages.

Modeling framework and specification

To test for the presence of anchoring effects and whether anchoring information treatments were an effective anchoring mitigation technique, a set of discrete choice models are used to analyze and compare the preference structures and WTP estimates across each of the treatment and control groups for the product. The discrete-choice random utility (RUM) framework (McFadden 1973) is used to analyze respondents’ choices among different bundle alternatives.

Equation 2 below represents the utility function of decision maker i over choice alternative j . It is assumed to contain both a deterministic and random component. The deterministic component ($\beta'x_{ij}$) is usually assumed to be a linear function of the choice attributes, the price of the choice, and individual characteristics, which are included through their interactions with an alternative-specific constant and β is a vector of coefficients assumed constant across individuals and choice alternatives.⁸ The random component (ε_{ij}) is included as an error term and is assumed to be randomly distributed.

⁶The purpose of the focus test question is to identify respondents who are not carefully reading and completing the survey. The focus test question used in this survey is as follows: “Felis is a genus of small and medium-sized cat species native to most of Africa, Europe, and Asia. We are checking to see how closely people follow directions. Please select ‘Not Sure’ for this question.”

⁷<https://www.m-s-g.com/Pages/prevision/>

⁸According to a helpful comment from a reviewer, one of the maintained assumptions of this study is that of linear and additively separable preferences. Therefore, the hypothesis tests we present only have the ability to uncover possible effects of the price and information interventions. A notable caveat with this approach is that when the null hypotheses are rejected, it could alternatively be the case this is restrictive preference specification is being rejected.

Table 2. Summary statistics of respondent characteristics by state

	Full sample	New Hampshire		Maine		Vermont	
		Sample	Actual ^a	Sample	Actual	Sample	Actual
Female	71.3%	73.1%	50.5%	74.7%	51.2%	62.9%	50.5%
Age (Median)	50	50	43	48	45	51	43
HH income (Median)	\$65,033	\$68,489	\$77,933	\$58,069	\$58,924	\$70,887	\$63,001
Education							
<HS grad	1.15%	1.5%	6.7%	1.0%	6.8%	0.8%	6.9%
High School/GED	19.3%	15.2%	28.1%	23.8%	31.4%	18.6%	29.0%
Some College	28.7%	30.5%	27.6%	30.7%	28.6%	22.6%	25.4%
4-year College Degree	31.2%	35.0%	22.9%	25.7%	20.8%	33.9%	22.7%
Graduate+	19.7%	17.8%	14.7%	18.8%	12.4%	24.2%	16.0%
Sample size (n)	523	197		202		124	

$$U_{ij} = \beta'x_{ij} + \varepsilon_{ij} \tag{2}$$

A rational decision maker chooses the alternative that yields the highest utility, such that the probability of decision maker *i* choosing alternative *j* over other alternatives *k* is

$$\pi_{ij} = \Pr(\beta'x_{ij} + \varepsilon_{ij} > \beta'x_{ik} + \varepsilon_{ik}) \quad \forall j \neq k \tag{3}$$

Assumptions about the distribution of the error term in Eq. 3 lead to different types of discrete choice models. For example, if we assume the error term follows an i.i.d. Type I extreme value distribution, the conditional logit model arises. This type of model is widely used in the choice-modeling literature. The benefits of using the conditional logit model are in its operational simplicity, whereas the costs are in: (1) its inability to account for preference heterogeneity across decision-makers; and (2) its restrictive IIA assumption.

Within this model, the conditional probability that decision maker *i* chooses alternative *j* can be expressed as

$$\pi_{ij} = \frac{\exp(\beta'x_{ij})}{\sum_{j=1}^J \exp(\beta'x_{ij})} \tag{4}$$

where *J* is the maximum number of choice alternatives faced by decision maker *i*. The log-likelihood function of the choice responses made by *n* decision-makers can be expressed as

$$L = \sum_{i=1}^n [y_{i1} \log(\pi_{i1}) + y_{i2} \log(\pi_{i2}) + \dots + y_{ij} \log(\pi_{ij})] \tag{5}$$

where *n* is the total number of decision makers, and $y_{ij} = 1$ if decision-maker *i* chooses alternative *j*, and $y_{ij} = 0$ otherwise.

For this analysis, the mixed logit modeling approach is used. (Train 2003) This class of models allows for individual preference heterogeneity and relaxes the restrictive IIA

^aActual values represent a summary of these measures across the populations for the three states individually and are pulled from the 2019 American Community Survey (ACS) maintained by the US Census: <https://data.census.gov/cedsci/table?q=United%20States>

assumption by allowing one or more of the parameters in the model to be randomly distributed (Revelt and Train 1998). Here, if we assume β to be randomly distributed with density $f(\beta_i|\theta)$ where θ represents the true parameters of the distribution, the unconditional probability of decision-maker i choosing alternative j is the conditional probability of (6) integrated over the distribution of β , or

$$\pi_{ij}^* = \frac{\exp(\beta'_i x_{ij})}{\sum_{j=1}^J \exp(\beta'_i x_{ij})} f(\beta_i|\theta) d\beta_i \tag{6}$$

Since the integral in (6) cannot be evaluated analytically, exact maximum likelihood estimation is not possible. Instead, the probability is approximated through simulation. The simulated log likelihood is given by

$$SLL(\theta) = \sum_{n=1}^N \ln\left[\frac{1}{R} \sum_{r=1}^R \pi_{ij}^*(\beta^r)\right] \tag{7}$$

where R is the number of replications and β^r is the r -th draw from $f(\beta_i|\theta)$.

Within this framework, welfare measures, i.e. marginal willingness to pay (WTP), are calculated according to Eq. 1, in which the non-monetary coefficients of interest (i.e. local, organic, etc . . .) are divided by the price coefficient and is carried out using the *wtp* command in Stata 13.1, the details of which can be found in Hole (2007a).

To test for anchoring effects, we run the following specification separately for each price split group who were not exposed to anchoring information (NoINFO), specifically,

$$U_{ij|LP, NoINFO} = f(P_{ij}, D_{ij}, SQ_i, Y_i * SQ_i, e_{ij}|\beta) \tag{8}$$

and

$$U_{ij|HP, NoINFO} = f(P_{ij}, D_{ij}, SQ_i, Y_i * SQ_i, e_{ij}|\alpha) \tag{9}$$

where P_{ij} indicates the price of alternative j presented to individual i , D_{ij} is a series of indicator variables identifying all of the choice alternative attributes, SQ_{ij} represents the status quo, or current purchasing behavior of individual i , and $(Y_i * SQ_i)$ which represents a set of interactions between the status quo alternative and other individual characteristics, including sex, income, and education, state-level dummy indicators, and a measure of purchasing experience¹⁰, and finally β and α represent the set of parameters that define each group. The test for anchoring effects is carried out by testing the equivalence of β and α across the two models via a likelihood ratio test developed in Swait and Louviere (1993), where the null hypothesis is $H_0^{Anch1} : \beta = \alpha$, or that parameter estimates are equivalent across the two groups. Within this specification, the binary attributes of interest (i.e. local, organic, indirect, and non-blemish) are assumed random and uncorrelated, each following a normal distribution.¹¹ Once

¹⁰A respondent was considered to have “purchasing experience” if they purchased organic and local produce in the past 6 months.

¹¹In our primary models, the price attribute is assumed constant. Thank you to a helpful comment from a reviewer, we acknowledge the expediency in this assumption, as the underlying linear utility function of multiple choice models, like the one employed here, is assumed linear for convenience and for easy derivation of welfare measures. We maintain this constant price assumption throughout the analysis, even given the potential approximation error, as Zhao and Huang (2018) develop a simulation study to examine the approximation errors in discrete choice welfare measures due to nonlinear income effects. There result is that there is no simple answer: the size of approximation errors will depend on the size of the price change, size of the proposed “quality improvement”, and whether the proposed quality improvement induced choice switches.

preference estimates are obtained and if H_0^{Anch1} is rejected, we also test for anchoring effects by differences in attribute-level marginal willingness-to-pay estimates across the two groups. The null hypothesis here is $H_0^{Anch2} : WTP_j^{LP|NoINFO} = WTP_j^{HP|NoINFO}$, where j represents the attribute of interest. Failure to reject H_0^{Anch1} or H_0^{Anch2} would suggest that price anchoring effects are not present in this choice experiment.

Lastly, to test the effectiveness of anchoring information (INFO) in mitigating anchoring effects relative to the neutral no information control (NoINFO), we take a similar approach as outlined above, but only estimate for those exposed to the information prompts. Specifically, we estimate

$$U_{ij|LP,INFO} = f(P_{ij}, D_{ij}, SQ_i, Y_i * SQ_i, e_{ij}|\gamma) \tag{10}$$

and

$$U_{ij|HP,INFO} = f(P_{ij}, D_{ij}, SQ_i, Y_i * SQ_i, e_{ij}|\tau) \tag{11}$$

and carry out similar likelihood ratio tests for data pooling, where the null hypotheses now can be represented by $H_0^{INFO1} : \gamma = \tau$ and $H_2^{INFO2} : WTP_j^{LP|INFO} = WTP_j^{HP|INFO}$. Here, failure to reject either H_0^{INFO1} or H_0^{INFO2} would suggest that the information intervention completely eliminated any anchoring effects. On the other hand, if H_0^{INFO1} or H_0^{INFO2} are rejected, then we test for mitigating effects of information by developing a measure of the difference in anchoring both before and after exposure to anchoring information, represented by

$$DIFF = \left(WTP_{j,k}^{INFO|HP} - WTP_{j,k}^{INFO|LP} \right) - \left(WTP_{j,k}^{NoINFO|HP} - WTP_{j,k}^{NoINFO|LP} \right). \tag{12}$$

Here, the null hypothesis is $H_0^{INFO3} : DIFF = 0$, or that anchoring effects before and after the information exposure are the same. If H_0^{INFO3} is rejected and $DIFF < 0$, this would indicate that information treatment instead had a mitigating effect on price anchoring. Finally, if H_0^{INFO3} is rejected and $DIFF > 0$, the anchoring intervention had a perverse effect on anchoring behavior.

If anchoring information did indeed have an effect on the level of anchoring, we can expect one of two things to happen. First, for those exposed to the low price sample, information treatment would reduce the price sensitivity of those consumers and for those exposed to the high price sample, we can expect just the opposite, in that price sensitivity for these individuals increases. That is to say, anchoring information can have an effect on price sensitivity for either group, but as the prices presented to the low price sample more closely align with actual market prices, we would expect greater effects of information in the high price sample.

All models based upon the above procedure are estimated in Stata (StataCorp 2013), using the *mixlogit* (Hole 2007b) command, which is simulated through Halton draws using 1000 replications.

Results

The results presented in this section detail summary measures of respondent choice frequencies, highlight the presence of anchoring in respondent choices, and uncover the mitigating effects of anchoring-specific information through both preferences and derived welfare estimates.

Table 3. Respondents' option selection frequency under two price levels in choice experiment

	No information				Information			
	Low price	High price	Diff	<i>P</i> -value	Low price	High price	Diff	<i>P</i> -value
Price level: 1	34.4%	37.8%	3.4%	0.2543	38.4%	38.0%	-0.4%	0.4559
Price level: 2	21.7%	22.3%	0.6%	0.4382	21.0%	22.6%	1.6%	0.3147
Price level: 3	21.1%	18.1%	-3.0%	0.2329	23.8%	19.4%	-4.4%	0.0844
Price level: 4	6.1%	1.1%	-5.0%	0.0043	3.7%	4.0%	0.3%	0.4087
Local	65.6%	61.7%	-3.9%	0.1577	60.7%	65.1%	4.4%	0.1482
Organic	50.0%	52.7%	2.7%	0.6333	51.8%	52.0%	0.2%	0.4593
No blemish	54.4%	51.1%	-3.3%	0.3234	53.4%	54.3%	0.9%	0.4531
Indirect	64.4%	63.3%	-1.1%	0.7976	64.0%	65.1%	1.1%	0.4628
Status Quo	9.4%	10.1%	0.7%	0.5843	4.3%	11.1%	6.8%	0.0004

Notes: Diff is calculated as the difference between the High Price and Low Price groups. *P*-values were calculated using a two-sample *t*-test assuming unequal variances across the two groups.

Respondent choice frequencies

As a first step in this analysis, we investigate whether respondent choice frequencies are variant to price scale and anchoring information exposure. The frequencies of respondents' selection of each alternative under the price and information treatments are summarized in Table 3. As theory would suggest, we can expect to see acceptance rates decrease as price increases, i.e. Price Level 1 to Price Level 4, and this mostly holds across each of the price scales and information treatments. Overall, across each of the price vectors and information treatments, we find the lowest price level is chosen more frequently than the highest price level; the only deviations from this rational action occur at price levels one level away from each other and the difference between these choice frequencies are not statistically significant. Additionally, looking at these choice frequencies across the two price groups, we find the only statistically significant difference in choice frequency at the highest price level for those not exposed to the anchoring information treatment. Specifically, those exposed to low prices were likely to choose the highest price level (\$4.99/lb.) 6.1% of the time, while those exposed to high prices were likely to choose the highest price level (\$8.98/lb.) 1.1% of the time. This difference in choice frequency at the highest price level does not hold for those exposed to the information intervention, suggesting some effects of the intervention on the respondents choice process.

In terms of the other choice attributes, some patterns begin to emerge across price vectors and information treatments. Specifically, we find that respondents choose at higher rates tomatoes that are locally produced, organic, non-blemished in appearance. We also find a clear preference for indirect purchasing (i.e. from a grocery store), regardless of price scale and information exposure. Further, we find that choice of the status quo option increased for those exposed to the high price scale, relative to the low, though this difference is only significant for those exposed to the information treatment. This is a result we expected to find and confirms that it is likely that status quo effects will be larger for respondents presented with the high price scale survey split (Samuelson and Zeckhauser 1988).

Presence of anchoring

Table 4 presents mixed logit model parameter estimates from the choice experiment for respondents exposed to high and low price splits without an anchoring information treatment, as well as pooled estimates across the two sample splits, for a total of three models. Across all three models the coefficient of the price attribute is well-behaved, in that a higher price reduces the chance of an alternative being chosen. Further, we find the absolute value of the price coefficient is lower for the high-price sample, suggesting lower sensitivity to price when respondents are exposed to higher price levels, consistent with diminishing marginal (dis)utility on price. The coefficients on the local and indirect attributes are positive and significant at the 99% level, suggesting that consumers prefer tomatoes that are grown locally and would prefer to purchase tomatoes through indirect venues, such as through a grocery store or supermarket.

Likelihood ratio tests were used to test whether changing the price level led to different parameter estimates in the choice experiment and are presented in the final row of Table 4. The restricted models are pooled across the high and low price vectors, while the unrestricted models (Columns 1 and 2) are split by high and low price vector. The null hypothesis for these tests is to not reject data pooling, i.e. consumers across the two price splits have the same set of preferences across product attributes and all possible interactions between attributes. Here, rejecting the null hypothesis would suggest that respondents' preferences for product attributes were sensitive to the price vector presented. The test statistic is presented in the bottom row of each of the tables. The critical chi-square value with 16 degrees of freedom at the 95% confidence level is 26.3. The null hypothesis is rejected in this case, showing that respondents' preferences for tomatoes were affected by the price vector presented in the choice experiment, suggesting the presence of price anchoring effects among respondent choices.

Mean marginal willingness-to-pay (WTP) for each of the attributes is presented in Table 5 and their accompanying confidence intervals are calculated using the Krinsky-Robb parametric bootstrap technique following the *wtpcikr* command in Stata 13.1. Here, Columns (1) and (2) represent WTP estimates from the low price and high price split, respectively, and Column (3) is the difference in WTP estimates between those same splits.

Overall, doubling the price level in the choice experiment substantially increased respondents marginal WTP for most attributes of tomatoes, thus consistent with the hypothesis of an anchoring effect. Specifically, holding all else constant, welfare estimates on the local and indirect attributes for those respondents presented with the high price sample increased by \$0.40 and \$0.30 per pound, respectively.¹² These increases in marginal WTP represent anchoring effects on the magnitude of 43.9% and 50.8% across these two attributes, respectively, and are significant at the 99% level.

Effects of the anchoring information intervention

A similar approach was used to test for potential mitigating effects of the anchoring information intervention. Specifically, Table 6 presents likelihood ratio tests to determine if exposure to the information intervention had a differential effect on model parameter estimates. Here, the restricted model is with pooled data from the choice experiment with both

¹²The coefficient on the 'direct' attribute from estimation was negative, suggesting that consumers consider directly-purchased tomatoes a 'bad', and thus gain disutility purchasing these produce in this capacity. Here, anchoring effects are thought to exacerbate the price penalty these consumers would need to face in order to purchase directly from the farmer.

Table 4. Mixed logit estimates for choice experiment before information treatment, by price level

	Low price (1)	High price (2)	Pooled (3)
Mean			
Local	0.657*** (0.191)	0.515** (0.200)	0.563*** -0.139
Organic	0.444 [†] (0.176)	0.226 (0.169)	0.291 [†] -0.118
No blemish	0.431 [†] (0.170)	0.340 (0.177)	0.423*** -0.113
Indirect	1.023*** (0.211)	0.713*** (0.199)	0.800*** -0.141
Price	-0.721*** (0.094)	-0.394*** (0.062)	-0.449*** -0.051
Status Quo (SQ)	-2.975** (1.073)	-1.374 (0.838)	-1.941** -0.616
SQ * Inc	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
SQ * Female	0.957 (0.660)	-0.153 (0.479)	0.225 (0.362)
SQ * Educ	0.078 (0.295)	-0.059 (0.244)	0.022 (0.171)
SQ * ME	0.555 (0.616)	-0.378 (0.496)	0.071 (0.36)
SQ * VT	0.714 (0.803)	0.052 (0.521)	0.317 (0.408)
SQ * experience	0.084 (0.587)	-0.741 (0.424)	-0.41 (0.319)
SD			
Local	-0.083 (0.590)	0.611 (0.508)	-0.343 (0.599)
Organic	0.702 (0.597)	1.038** (0.384)	0.916** (0.279)
Indirect	-0.014 (0.636)	1.018 [†] (0.400)	0.404 (0.524)

(Continued)

Table 4. (Continued)

	Low price	High price	Pooled
	(1)	(2)	(3)
No blemish	1.003 ^ˆ	0.686	0.759*
	(0.462)	(0.475)	(0.324)
LR Chi ²	4.22912	6.568399	8.882694
Log-likelihood	-293.1063	-365.1414	-674.3198
# Choices (Obs)	1186	1306	2492
# Respondents	76	122	198
LR test stat		32.1442***	

Notes: Numbers in parentheses are standard errors.

***, **, * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Bolded LR Test Stat indicates statistic is significant at the 0.01 level or lower.

the information treatment (INFO) and no information control (NoINFO), while the unrestricted models are the separate models from the choice experiment, one with the INFO treatment and the other with NoINFO control. The null hypothesis here is, again, failure to reject data pooling between the two samples and ejection of the null hypothesis in this respect would suggest that the information intervention affected respondents' choices across price vectors. The critical chi-square value with 14 degrees of freedom at the 95% confidence level is 26.296. Therefore, as is shown in the bottom row of Table 6, the null hypothesis of equal parameters is not rejected for each price split, providing evidence that the information intervention did not completely eliminate the anchoring effects discussed above. It is important to note that this does not rule out potential mitigating effects of the information intervention, as the differences in preferences across the models are primarily among the coefficient on price, and not coefficients across all of the model parameters.

To understand if the information intervention had a mitigating effect on anchoring, we follow a similar procedure as above by testing for pooling across the two price vectors for those only exposed to the information intervention. Additionally, as there seemed to be some evidence of a potential treatment effect of exposure to information on the price attribute, an information interaction term (INFO) was included across each of these models, here interacting a dummy identifying exposure to information with the price attribute and the status quo option only. Results for these models are presented in Table 7. The interactions between the price and status quo with the information dummy variable are insignificant, suggesting that exposure to information did not have a significant effect on the choice of price or the status quo. Additionally, we run a pooling procedure as detailed above and reject the null hypothesis of data pooling across the high and low price sample groups, again implying that the information intervention failed to eliminate anchoring effects.

We can additionally test for the mitigating effects of information exposure on welfare estimates. Table 8 below presents mean marginal WTP estimates across price-vector after controlling for information treatment exposure and are calculated based on parameter estimates from Table 7. If anchoring-specific information prompts were to completely eliminate anchoring effects, we would expect to see no significant difference in the

Table 5. Evidence of anchoring effects: effects of doubled price level in choice experiment on difference in mean marginal WTP (\$/pound)

	WTP_{LP}	WTP_{HP}	Diff
	(1)	(2)	(3)
Local	0.91***	1.31**	0.40***
(95% CI)	(0.91, 0.92)	(1.17, 1.37)	
Organic	0.61	0.56	-
(95% CI)	(0.55, 0.67)	(0.42, 0.75)	
Indirect	0.59***	0.89***	0.30***
(95% CI)	(0.59, 0.60)	(0.76, 0.97)	
No Blemish	1.42 [*]	1.79	-
(95% CI)	(1.27, 1.44)	(1.66, 1.88)	

Notes: WTP_{LC} and WTP_{HC} are predicted WTP from respondents who participated in choice experiment with low price (LP) and high price (HP) levels. Diff are differences between respondents predicted WTP between the different price levels: Diff = $WTP_{HC} - WTP_{LC}$.

***, ***, * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Diff only shown for those WTP figures that are significant at the 0.01 level.

WTP estimates between each of the high and low price splits after exposure and is not something we expect to find based upon the pooling procedures above. Overall, we still find significant differences between these two price splits, suggesting that exposure to information was insufficient at eliminating price anchoring effects. Rather, we find that exposure to information had heterogeneous impacts on WTP estimates. In particular, for those exposed to the low price split, WTP estimates increased for each attribute of tomatoes after exposure to anchoring information. Conversely, for those exposed to the high price split, WTP estimates decreased across attributes after exposure to the same intervention.

Though the results detailed above suggest that anchoring-specific information prompts were unable to completely eliminate price anchoring in this choice experiment, Table 9 presents evidence that it was successful at mitigating anchoring effects. Columns (1) and (2) of Table 9 show the differences in WTP estimates between high and low price splits and the DIFF column shows the change in those differences after exposure to information, and can be interpreted as a reduction in anchoring effects induced by the information treatment. Here, negative values would suggest a reduction in anchoring effects and positive values an increase. We calculate the overall difference in anchoring by subtracting the absolute value of the difference for those not exposed to the intervention from the difference in the value for those who were exposed. As is shown in Table 9, the information intervention is associated with a reduction in anchoring effects of 60% and 80% on the local and indirect attributes, respectively, and these reductions in anchoring are primarily driven by the interventions impact on the price attribute.

Conclusions and discussion

This analysis reveals a conclusion that is novel, though perhaps unsurprising: *ex ante* treatments in the form of “information” aimed at affecting price sensitivity in choice

Table 6. Mixed logit estimates for choice experiment with information treatment (INFO) and no information control (NoINFO), by high price and low price levels

	Low price			High price		
	NoINFO	INFO	Pooled	NoINFO	INFO	Pooled
	(1)	(2)	(3)	(4)	(5)	(6)
Mean						
Local	1.399** (0.435)	0.508 [†] (0.245)	0.657*** (0.191)	0.164 (0.326)	0.761** (0.273)	0.515** (0.200)
Organic	0.836 (0.551)	0.439 [†] (0.202)	0.444 [†] (0.176)	0.123 (0.285)	0.417 (0.239)	0.226 (0.169)
Indirect	0.989 [†] (0.399)	0.244 (0.224)	0.431 [†] (0.170)	0.230 (0.308)	0.447 (0.238)	0.340 (0.177)
No blemish	1.446 [†] (0.737)	0.987*** (0.270)	1.023*** (0.211)	0.601 (0.333)	0.857** (0.269)	0.713*** (0.199)
Price	-0.786*** (0.189)	-0.775*** (0.135)	-0.721*** (0.094)	-0.527*** (0.120)	-0.356*** (0.078)	-0.394*** (0.062)
Status Quo (SQ)	-5.731 (4.926)	-3.870 [†] (1.874)	-2.975** (1.073)	0.326 (1.522)	-2.323 [†] (1.181)	-1.374 (0.838)
SQ * Inc	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
SQ * Female	2.103 (2.550)	0.946 (1.199)	0.957 (0.660)	-0.471 (0.950)	0.039 (0.634)	-0.153 (0.479)
SQ * Educ	0.510 (1.026)	0.014 (0.428)	0.078 (0.295)	-0.227 (0.673)	0.066 (0.288)	-0.059 (0.244)
SQ * ME	5.055 (3.032)	-1.638 (1.036)	0.555 (0.616)	-0.430 (1.096)	-0.420 (0.606)	-0.378 (0.496)
SQ * VT	8.915 [†] (4.108)	-1.688 (1.192)	0.714 (0.803)	-0.108 (1.103)	0.116 (0.671)	0.052 (0.521)
SQ * experience	-1.627 (1.466)	2.266 (1.201)	0.084 (0.587)	-2.428 [†] (1.055)	-0.246 (0.543)	-0.741 (0.424)
SD						
Local	0.050 (0.818)	-0.014 (0.712)	-0.083 (0.590)	-0.266 (0.846)	0.780 (0.503)	0.611 (0.508)
Organic	1.979 (1.149)	-0.057 (0.935)	0.702 (0.597)	1.011 (0.658)	1.181 [†] (0.503)	1.038** (0.384)
Indirect	0.070 (1.078)	-0.216 (1.247)	-0.014 (0.636)	0.904 (0.673)	1.313** (0.487)	1.018 [†] (0.400)

(Continued)

Table 6. (Continued)

	Low price			High price		
	NoINFO (1)	INFO (2)	Pooled (3)	NoINFO (4)	INFO (5)	Pooled (6)
Blemish	3.337** (1.181)	0.431 (0.934)	1.003' (0.462)	0.596 (0.927)	-0.873 (0.619)	0.686 (0.475)
LR Chi ²	19.874	0.055	4.229	2.144	6.443	6.568
Log-likelihood	-109.2308	-163.5188	-293.1063	-119.3416	-237.3181	-365.1414
# Choices (Obs)	456	730	1186	474	832	1306
# Respondents	76	122	198	79	139	218
LR test stat		-20.3567			-8.4817	

Notes: Numbers in parentheses are standard errors.

****Indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Bolded LR Test Stat indicates statistic is significant at the 0.01 level or lower.

experiments have potential to mitigate price anchoring effects. Specifically, we find that using a split sample experimental design, doubling the price vector in this choice experiment increases marginal willingness-to-pay from 44 to 51% and that exposure to anchoring-specific information interventions decreases these anchoring effects between 60 and 80%. It is worth noting that the convergence of the HighPrice/INFO and LowPrice/NoINFO group welfare estimates is not due exclusively to changes in the price coefficient of the anchoring information treatment groups. When we refer to the “effect of information”, we are not referring to the price coefficient explicitly. Rather, we interpret the information effect as the wedge that forms in the welfare estimates derived from both the treatment and control groups, which can be due to differences in the price coefficient or other attribute coefficients from which the welfare estimate is calculated.

Methodologically, the results presented here have important implications for future choice experiment design. Choice experiments come in many forms, and many decisions can impact researchers’ ability to accurately elicit preferences. Each decision is not made in a vacuum; instead the appropriateness of one choice depends on other choices, which underlies the importance of thorough pretesting in the survey design process. Our analysis is not the first to suggest that the effects of price anchoring may pose significant issues for choice experiment design and context. Our analysis is, though, the first to provide evidence that *ex ante* information interventions have the potential to mitigate some of these anchoring effects in online choice exercises.

It is also possible that the nature of the products being considered (i.e. private vs. public goods) may be driving some of these results, though it is a priori unclear in which direction. For example, the price anchoring effects found in this study are smaller than anchoring effects found in other similar studies that examine public goods (Carlsson and Martinsson 2007). A potential explanation here could be in terms of variations in experience, through which individuals are thought to learn their preferences after a greater experience with the product, or in the choice experiment setting, over repeated choices. Given that respondents have actual experience in a market setting purchasing tomatoes, respondent price sensitivity might be lower in this private good setting. Also, for this reason, information intervention effects might be smaller in this setting as this information is

Table 7. Mixed logit estimates for choice experiment with high price and low price levels incl. INFO interactions, by price level

	Low price (1)	High price (2)	Pooled (3)
Mean			
Local	0.682*** (0.196)	0.522 [†] (0.204)	0.568*** (0.140)
Organic	0.494** (0.187)	0.235 (0.173)	0.291 [†] (0.118)
No blemish	0.437 [†] (0.176)	0.356 [†] (0.180)	0.426*** (0.113)
Indirect	1.057*** (0.223)	0.724*** (0.202)	0.803*** (0.141)
Price	-0.606*** (0.129)	-0.542*** (0.109)	-0.503*** (0.078)
Price * INFO	-0.240 (0.175)	0.205 (0.107)	0.08 (0.084)
Status Quo (SQ)	-1.874 (1.150)	-2.020 [†] (0.946)	-1.845** (0.660)
SQ * INFO	-1.607** (0.601)	0.917 (0.528)	-0.139 (0.341)
SQ * Inc	-0.000 (0.000)	0.000 (0.000)	0.242 (0.362)
SQ * Female	1.190 (0.697)	-0.159 (0.489)	0.005 (0.173)
SQ * Educ	0.034 (0.315)	-0.047 (0.247)	0.061 (0.362)
SQ * ME	0.306 (0.639)	-0.349 (0.502)	0.313 (0.408)
SQ * VT	0.975 (0.834)	0.120 (0.532)	-0.387 (0.321)
SQ * experience	0.175 (0.603)	-0.852 (0.443)	-0.139 (0.341)
SD			
Local	-0.064 (0.499)	0.672 (0.481)	-0.372 (0.570)

(Continued)

Table 7. (Continued)

	Low price (1)	High price (2)	Pooled (3)
Organic	−0.701 (0.466)	1.102** (0.382)	0.911** (0.283)
Indirect	−0.111 (0.636)	1.029** (0.393)	0.416 (0.512)
No blemish	1.172** (0.401)	0.704 (0.465)	0.763 [†] (0.327)
LR Chi ²	6.854	7.271	8.719087
Log-likelihood	−287.7915	−362.3024	−673.6043
# Choices (Obs)	1186	1306	2492
# Respondents	198	218	416
LR test stat		47.0208***	

Notes: Numbers in parentheses are standard errors.

***, **, * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Bolded LR Test Stat indicates statistic is significant at the 0.01 level or lower.

expected to have more significant impact on respondents of lower levels of certainty over their preferences for the products in question. Further research is required to test the differences in information interventions between public and private goods and across respondents of varying experience.

In the application of this paper, we investigate Northern New England residents' preferences for fresh tomatoes. Overall, our estimates reveal that consumers are willing to pay a substantial price premium for locally grown tomatoes, in the range of \$0.96–\$1.12 per pound, whereas they are not willing to pay a price premium for organically grown tomatoes. These results are similar to those found in Thilmany *et al.* (2008) and Werner *et al.* (2018). Together, these studies lend support to farmers and policy makers decisions over the production of locally grown fresh produce. Comparing the premiums for locally and organically grown attributes, Northern New England consumers tend to consider the locally grown attribute as a more important feature when purchasing produce. These results may offer some guidance for farmers regarding growing practice and farm land use as regional coalitions support local agriculture expansion in the Northeast (McCabe and Burke 2012).

Overall, these results draw conclusions that are important for the stated-preference valuation literature and lend themselves to an active research agenda moving forward. Specifically, interventions that test variations of anchoring-specific information interventions and reiterate the main assertions of the information script repeatedly through the choice experiment may serve as an additional catalyst for price anchoring mitigation. Our hope is that this work encourages researchers to be mindful of the effects of the choice of price vectors in the choice experiment setting and to build short anchoring information interventions into future research designs. This approach is of relatively low cost and is crucial to furthering the field's understanding of how different design decisions impact response and preference elicitation in stated preference surveys.

Table 8. Evidence of anchoring after information exposure: effects of doubled price level after controlling for exposure to anchoring information in choice experiment on difference in mean marginal WTP (\$/pound), for mixed logit model

	WTP _{LP} (1)	WTP _{HP} (2)	Diff (3)
Local	1.12***	0.96*	-0.16***
(95% CI)	(1.12, 1.13)	(0.91, 1.07)	
Organic	0.83	0.40	-
(95% CI)	(0.70, 0.85)	(0.28, 0.53)	
Indirect	0.72***	0.66***	-0.06***
(95% CI)	(0.71, 0.74)	(0.56, 0.79)	
No Blemish	1.72*	1.35	-
(95% CI)	(1.53, 1.77)	(1.28, 1.43)	

Notes: WTP_{LP} and WTP_{HP} are predicted WTP from respondents who participated in choice experiment with low price (LP) and high price (HP) levels. Diff are differences between respondents predicted WTP between the different price levels: Diff = WTP_{HP} - WTP_{LP}.

***, **, * Indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.

Diff only shown for those WTP figures that are significant at the 0.01 level.

Table 9. Reduction in anchoring effects before and after information: differential effects of doubled price level before and after controlling for exposure to information in choice experiment on mean marginal WTP (\$/pound)

	Diff (NoINFO) (1)	Diff (INFO) (2)	DIFF = (2) - (1)
Local	0.40	-0.16	-0.24 (-60.0%)
Indirect	0.30	-0.06	-0.24 (-80.0%)

Notes: Values presented are WTP estimates from respondents who participated in choice experiment with low price (LP) and high price (HP) levels.

Diff are differences in simulated WTP between the different price levels, by anchoring information treatment: Diff = WTP_{HP} - WTP_{LP}.

DIFF represents differences in the differences between price split and information treatment and can be interpreted as a reduction in anchoring effects induced by the information treatment.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/age.2022.10>

Acknowledgements. The authors would like to acknowledge Samantha Werner, Maria Pyburn, and Wei Shi for their initial efforts in developing the survey instrument. Additionally, we would like to thank Bruce Pfeiffer and participants from the 2018 Workshop on Non-Market Valuation for their helpful comments on this work.

Author Contributions. All authors contributed equally to the development of this paper.

Funding statement. This research was supported by the National Institutes for Food and Agriculture (NIFA), U.S. Department of Agriculture, and by the New Hampshire Agricultural Experiment Station under Multistate Project 1749. This is Scientific Contribution #2746.

Competing interests. None.

Ethical Standards. Informed consent was obtained from all individual participants involved in the study.

References

- Aadland, D., A. Caplan, and O. Phillips. 2007. "A Bayesian examination of information and uncertainty in contingent valuation." *Journal of Risk and Uncertainty* 35 (2): 149–178.
- Aadland, D.M., and A.J. Caplan. 2006a. "Cheap talk reconsidered: New evidence from CVM." *Journal of Economic Behavior and Organization* 60 (4): 562–578.
- Adalja, A., J. Hanson, C. Towe, and E. Tselepidakis. 2015. "An examination of consumer willingness to pay for local products." *Agricultural and Resource Economics Review* 44 (3): 253–274.
- Adamowicz, V., P. Boxall, M. Williams, and J. Louviere. 1998. "Stated preference approaches to measuring passive use values." *American Journal of Agricultural Economics* 80: 64–75.
- Adams, D.C., and M.J. Salois. 2010. "Local versus organic: A turn in consumer preferences and willingness to pay." *Renewable Agriculture and Food Systems* 25 (4): 331–341.
- Alberini, A., M. Veronesi, and J. Cooper. 2005. "Detecting starting point bias in dichotomous-choice contingent valuation surveys." FEEM Working Paper No. 119.05.
- Alevy, J.E., C.E. Landry, and J.A. List. 2011. "Field experiments on anchoring of economic valuations." *Economic Inquiry* 53 (3): 1522–1538.
- Ariely, D., G. Loewenstein, and D. Prelec. 2003. "Coherent arbitrariness: Stable demand curves without stable preferences." *The Quarterly Journal of Economics* 118 (1): 73–106.
- Bateman, I.J., B.H. Day, A.P. Jones, and S. Jude. 2009. "Reducing gain–loss asymmetry: A virtual reality choice experiment valuing land use change." *Journal of Environmental Economics and Management* 58 (1): 106–118.
- Bliemer, M.C., and J.M. Rose. 2013. "Confidence intervals of willingness to pay for random coefficient logit models." *Transportation Research Part B: Methodological* 58: 199–214.
- Bockstael, N.E., K.E. McConnell, and I.E. Strand. 1991. *Measuring the demand for environmental quality, part 8: Recreation*. New York, NY: Elsevier Science Publication Co.
- Bond, C., D. Thilmany, and J. Keeling-Bond. 2008. "Understanding consumer interest in product and process based attributes for fresh produce." *Agribusiness* 24: 231–252.
- Boyle, K., R. Bishop, and M. Welsh. 1985. "Starting point bias in contingent valuation surveys." *Land Economics* 61: 188–194.
- Breffle, W.S., and R.D. Rowe. 2002. "Comparing choice question formats for evaluating natural resource tradeoffs." *Land Economics* 78 (2): 298–314.
- Brown, C., and S. Miller. 2008. "The impacts of local markets: A review of research on farmers markets and community supported agriculture (CSA)." *American Journal of Agricultural Economics* 90 (5): 1296–1302.
- Cameron, T., and J. Quiggin. 1994. "Estimation using contingent valuation data from a "dichotomous choice with follow-up questionnaire." *Journal of Environmental Economics and Management* 27: 218–234.
- Carlsson, F., P. Frykblom, and C.J. Lagerkvist. 2007. "Consumer benefits of labels and bans on GM foods—choice experiments with Swedish consumers." *American Journal of Agricultural Economics* 89 (1): 152–161.
- Carlsson, F., and P. Martinsson. 2007. "How much is too much? An investigation of the effect of the number of choice sets, starting point and the choice bid vectors in choice experiments." *Environmental and Resource Economics* 40 (2): 165–176.
- Carpio, C., and O. Isengildina-Massa. 2009. "Consumer willingness to pay for locally grown products: The case of South Carolina." *Agribusiness* 25 (3): 412–426.

- Caussade, S., J. de Dios Ortúzar, L.I. Rizzi, and D.A. Hensher. 2005. "Assessing the influence of design dimensions on stated choice experiment estimates." *Transportation Research Part B: Methodological* 39 (7): 621–640.
- Chapman, G.B., and E.J. Johnson. 1999. "Anchoring, activation, and the construction of values." *Organizational Behavior and Human Decision Processes* 79: 1–39.
- Chien, Y., C. Huang, and D. Shaw. 2005. "A general model of starting point bias in double-bounded dichotomous contingent valuation surveys." *Journal of Environmental Economics and Management* 50 (2): 362–377.
- Crawford, V., and J. Sobel. 1982. "Strategic information transmission." *Econometrica* 50: 1431–1451.
- Cummings, R.G., and L.O. Taylor. 1999. "Unbiased value estimates for environmental goods: A cheap talk design for the contingent valuation method." *American Economic Review* 89 (3): 649–665.
- Darby, K., M. Batte, S. Ernst, and B. Roe. 2008. "Decomposing local: A conjoint analysis of locally produced foods." *American Journal of Agricultural Economics* 90 (2): 476–486.
- DeShazo, J.R., and G. Fermo. 2002. "Designing choice sets for stated preference methods: The effects of complexity on choice consistency." *Journal of Environmental Economics and Management* 44 (1): 123–142.
- Donahue, B., J. Burke, M. Anderson, A. Beal, T. Kelly, M. Lapping, H. Ramer, R. Libby, and L. Berlin. 2012. "A New England Food Vision", Food Solutions New England.
- Epley, N. and T. Gilovich. 2001. "Putting adjustment back into the anchoring and adjustment heuristic: Differential processing of self-generated and experimenter provided anchors." *Psychological Science* 12: 391–396.
- Frykblom, P. and J.F. Shogren. 2000. "An experimental testing of anchoring effects in discrete choice questions." *Environmental and Resource Economics* 16: 329–341.
- Fudenberg, D., D.K. Levine, and Z. Maniadis. 2012. "On the robustness of anchoring effects in WTP and WTA experiments." *American Economic Journal – Microeconomics* 4: 131–145.
- Giraud, K., C. Bond, and J. Bond. 2005. "Consumer preferences for locally made specialty food products across Northern New England." *Agricultural and Resource Economics Review* 34 (2): 204–216.
- Glenk, K., J. Meyerhoff, F. Akaichi, and J. Martin-Ortega. 2019. "Revisiting cost vector effects in discrete choice experiments." *Resource and Energy Economics* 57: 135–155.
- Hanley, N., W. Adamowicz, and R. Wright. 2005. "Price vector effects in choice experiments: An empirical test." *Resource Energy Economics* 27 (3): 227–234.
- Hensher, D.A. 2006. "Revealing differences in willingness to pay due to the dimensionality of stated choice designs: An initial assessment." *Environmental and Resource Economics* 34 (1): 7–44.
- Herriges, J., and J. Shogren. 1996. "Starting point bias in dichotomous choice valuation with follow-up questioning." *Journal of Environmental Economics and Management* 30 (1): 112–131.
- Hoehn, J.P., F. Lupi, and M.D. Kaplowitz. 2010. "Stated choice experiments with complex ecosystem changes: The effect of information formats on estimated variances and choice parameters." *Journal of Agricultural and Resource Economics* 35: 568–590.
- Hole, A.R. 2007a. "A comparison of approaches to estimating confidence intervals for willingness to pay measures." *Health Economics* 16: 827–840.
- Hole, A.R. 2007b. "Estimating mixed logit models using maximum simulated likelihood." *The Stata Journal* 7 (3): 388–401.
- Holmes, T.P., and W.L. Adamowicz. 2003. "Attribute-based methods" in a primer on nonmarket valuation. Dordrecht: Kluwer Academic Publishers.
- James, J., B. Rickard, and W. Rossman. 2009. "Product differentiation and market segmentation in apple-sauce: Using a choice experiment to assess the value of organic, local, and nutrition attributes." *Agricultural and Resource Economics Review* 38 (3): 357–370.
- Johnston, R.J., K.J., Boyle, W. Adamowicz, J. Bennett, R. Brouwer, T.A. Cameron, and R. Tourangeau. 2017. "Contemporary guidance for stated preference studies." *Journal of the Association of Environmental and Resource Economists* 4 (2): 319–405.
- Kahneman, D., and A. Tversky. 1979. "Prospect theory: An analysis of decision under risk." *Econometrica* 47: 263–291.
- Kragt, M.E., and J.W. Bennett. 2012. "Attribute framing in choice experiments: How do attribute level descriptions affect value estimates?" *Environmental and Resource Economics* 51 (1): 43–59.

- Ladenburg, O., and S. Olsen.** 2008. "Gender-specific starting point bias in choice experiments: Evidence from an empirical study." *Journal of Environmental Economics and Management* 56: 275–285.
- Lancaster, K.J.** 1966. "A new approach to consumer theory." *Journal of Political Economy* 74 (2): 132–157.
- LeBoeuf, R.A., and E. Shafir.** 2009. "Anchoring and the "Here" and "Now" in time and distance judgments." *Journal of Experimental Psychology* 35: 81–93.
- Lichtenstein, S., and P. Slovic.** (2006). *The construction of preference*. New York, NY: Cambridge University Press.
- Loomis, J., A. Gonzalez-Caban, and R. Gregory.** 1994. "Do reminders of substitutes and budget constraints influence contingent valuation estimates?" *Land Economics* 70 (4): 499–506.
- Loureiro, M.L., and S. Hine.** 2002. "Discovering niche markets: A comparison of consumer willingness to pay for local (Colorado grown), organic, and GMO-free products." *Journal of Agricultural and Applied Economics* 39 (2): 477–487.
- McCabe, M.S., and J. Burke.** 2012. "The New England food system in 2060: Envisioning tomorrow's policy through today's assessments." *Maine Law Review* 65 (2): 549–579.
- McElroy, T., and K. Dowd.** 2007. "Susceptibility to anchoring effects: How openness-to-experience influences responses to anchoring cues." *Judgment and Decision Making* 2: 48–53.
- McFadden, D.** 1973. "Conditional logit analysis of qualitative choice behavior." *Frontiers in Econometrics*: 105–142.
- McFadden, D.** 1974. "The measurement of urban travel demand." *Journal of Political Economy* 3 (4): 303–328.
- Mørkbak, M.R., T. Christensen, and D. Gyrd-Hansen.** 2010. "Choke price bias in choice experiments." *Environmental and Resource Economics* 45 (4): 537–551.
- Munro, A., and N.D. Hanley.** 2001. Information, uncertainty, and contingent valuation. In *Valuing environmental preferences: Theory and practice of the contingent valuation method in the US, EU, and developing countries*. Oxford: Oxford University Press, pp. 258–274.
- Mussweiler, T., and B. Englich.** 2005. "Subliminal anchoring: Judgmental consequences and underlying mechanisms." *Organizational Behavior and Human Decision Process* 98: 133–143.
- Mussweiler, T., and F. Strack.** 1999. "Hypothesis-consistent testing and semantic priming in the anchoring paradigm: A selective accessibility model." *Journal of Experimental Social Psychology* 35: 136–164.
- Ohler, T., A. Le, J. Louviere, and J. Swait.** 2000. "Attribute range effects in binary response tasks." *Marketing Letters* 11 (3): 249–260.
- Onken, K., J. Bernard, and J. Pesek.** 2011. "Compare willingness to pay for organic, natural, locally grown, and state marketing program promoted foods in the mid-Atlantic region." *Agricultural and Resource Economics Review* 40 (1): 33–47.
- Onozaka, Y., and D.T. McFadden.** 2011. "Does local labeling complement or compete with other sustainable labels? A conjoint analysis of direct and joint values for fresh produce." *American Journal of Agricultural Economics* 93 (3): 693–706.
- Plous, S.** 1989. "Thinking the unthinkable: The effects of anchoring on likelihood estimates of nuclear war." *Journal of Applied Social Psychology* 19: 67–91.
- Poe, G.L., K.L. Giraud, and J.B. Loomis.** 2005. "Computational methods for measuring the difference of empirical distributions." *American Journal of Agricultural Economics* 87 (2): 353–365.
- Pyburn, M., K. Puzacke, J. Halstead, and J. Huang.** 2016. "Sustaining and enhancing local and organic agriculture: Assessing consumer issues in New Hampshire." *Agroecology and Sustainable Food Systems* 40 (1): 69–95.
- Revelt, D., and Train, K.** 1998. "Mixed logit with repeated choices." *The Review of Economics and Statistics* 80: 647–657.
- Rid, W., W. Haider, A. Ryffel, and B. Beardmore.** 2018. "Visualisations in choice experiments: Comparing 3D film-sequences and still-images to analyse housing development alternatives." *Ecological Economics* 146: 203–217.
- Rolfe, J., J. Bennett, and J. Louviere.** 2002. "Stated values and reminders of substitute goods: Testing for framing effects with choice modelling." *Australian Journal of Agricultural and Resource Economics* 46 (1): 1–20.
- Rolfe, J., and J. Windle.** 2015. "Testing attribute selection and variation in a choice experiment to assess the tradeoffs associated with increased mining development." *Land Use Policy* 42: 673–682.

- Ryan, M., and S. Wordsworth. 2000. "Sensitivity of willingness to pay estimates to level of attributes in discrete choice experiments." *Scottish Journal of Political Economy* 47 (5): 504–524.
- Samuelson, W., and R. Zeckhauser. 1988. "Status quo bias in decision making." *Journal of Risk and Uncertainty* 1 (1): 7–59.
- Sandorf, E.D., R.C. dit Sourd, and P.A. Mahieu. 2018. "The effect of attribute-alternative matrix displays on preferences and processing strategies." *Journal of Choice Modelling* 29: 113–132.
- Shr, Y.H.J., R. Ready, B. Orland, and S. Echols. 2019. "How do visual representations influence survey responses? Evidence from a choice experiment on landscape attributes of green infrastructure." *Ecological Economics* 156: 375–386.
- Slovic, P. 1967. "The relative influence of probabilities and payoffs upon perceived risk of a gamble." *Psychonomic Science* 9 (4): 223–224.
- StataCorp. (2013). *Stata statistical software: Release 13*. College Station, TX: StataCorp LP.
- Strack, F., and T. Mussweiler. 1997. "Explaining the enigmatic anchoring effect: Mechanisms of selective accessibility." *Journal of Personality and Social Psychology* 73: 437–446.
- Su, L., B.D. Adam, J.L. Lusk, and F. Arthur. 2017. "Anchoring, information, and fragility of choice experiments: An application to consumer willingness to pay for rice with improved storage management." *Journal of Agricultural and Resource Economics* 42 (2): 254–273.
- Sugden, R., J. Zheng, and D.J. Zizzo. 2013. "Not all anchors are created equal." *Journal of Economic Psychology* 39: 21–31.
- Swait, J., and J. Louviere. 1993. "The role of the scale parameter in the estimation and comparison of multinomial logit models." *Journal of Marketing Research* 30 (3): 305–314.
- Thilmany, D., C.A. Bond and J.K. Bond. 2008. "Going local: Exploring consumer behavior and motivations for direct food purchases." *American Journal of Agricultural Economics* 90 (5): 1303–1309.
- Train, K. 2003. *Discrete choice methods with simulation*. Cambridge, UK: Cambridge University Press.
- Tufano, F. 2010. "Are 'true' preferences revealed in repeated markets? An experimental demonstration of context-dependent valuations." *Experimental Economics* 13: 1–13.
- Tversky, A., and D. Kahneman. 1974. "Judgment under uncertainty: Heuristics and biases." *Science* 185 (4157): 1124–1131.
- Werner, S., S.R. Lemos, A. McLeod, J.M. Halstead, T. Gabe, J.C. Huang, C.L. Liang, W. Shi, L. Harris, and J. McConnon. 2019. "Prospects for New England agriculture: Farm to fork." *Agricultural and Resource Economics Review* 48 (3): 473–504.
- Whitehead, J. 2002. "Incentive incompatibility and starting point bias in iterative valuation questions." *Land Economics* 78 (2): 285–297.
- Zhao, M.Q., and J.C. Huang. 2018. "The representative consumer approximation bias in discrete choice welfare analysis." *Environmental & Resource Economics* 71 (4): 969–984.