CHOICES
A publication of the Agricultural & Applied Economics Association
AAEA Agricultural & Applied Economics Association
1st Quarter 2017 • 32(1)

Importance of Perceived "Naturalness" to the Success of Urban Farming

Iryna Printezis, Carola Grebitus, and Antonios Printezis

JEL Classifications: M310, Q130, Q180
Keywords: Choice experiment, Consumer, Natural, Preferences, Tomatoes, Urban agriculture

Is Urban Farmed Food More "Natural"?

Urban farming is the practice of growing, processing, and distributing food within city limits (Bailkey and Nasr, 1999)—for example, community gardening in vacant lots and parks (U.S. Department of Agriculture, National Agricultural Library, 2016; University of California, Urban Agriculture, 2016). Urban farming provides many benefits to consumers and their communities, including learning how to farm and enhancing ties among people in a neighborhood (U.S. Department of Agriculture, 2016). However, for urban farming to be successful, consumers need to prefer food products sold at urban farms over those sold at more traditional shopping outlets such as grocery stores. Why might consumers prefer food from one outlet over another?

In this regard, Rozin et al. (2004) and Rozin (2006) show that consumers prefer "natural" entities and believe that naturalness influences the health value of food (Siipi, 2013). In other words, consumers feel that natural food is healthy (Rozin et al., 2004; Rozin, 2005; Saher, 2006). At the same time, they believe that urban farms offer access not only to nature but also to organic food and that products sold at urban farms provide perceived health benefits (Kolodinsky and Pelch, 1997; Armstrong, 2000). Considering this, we test whether consumers prefer urban farms as shopping outlets because they perceive urban farming to be natural. Specifically, our aim is to examine consumer preferences for produce from urban farming while considering the perceived naturalness of production methods. Given that consumers tend to believe that urban farming uses organic production methods, we also examine consumers' preferences for urban farming when organic production is perceived as natural.

Our findings are useful to farmers and marketers planning to grow and offer produce at urban farms. Knowledge about consumers who prefer food from urban farms enables stakeholders to market their products to those who are looking for them and develop target-oriented marketing and promotional activities. Our results will also allow us to identify consumers who do not yet prefer produce from urban farms but might be open to consider it when provided with more information.

Consumers Prefer "Natural"

To date, a number of food-related studies have examined the effect of "natural" on consumer willingness to pay and preferences. For example, Gifford and Bernard (2011) find that consumers are willing to pay significantly more for chicken labeled as "natural." Similarly, Lusk and Schroeder (2004) show a higher willingness to pay for beef products with a "natural" label. Umberger, Thilmany McFadden, and Smith (2009) find that consumers prefer "natural" and regionally produced beef. They point out that these preferences are caused in part by the perception of personal benefits.

We extend the work by Umberger, Thilmany McFadden, and Smith (2009) by introducing "perceived naturalness" as a psychological construct that drives preferences for produce from various retailing outlets. In addition, we examine whether perceived naturalness influences preferences for produce from urban farms or if it is linked to organic production, since organic is often associated with a natural way of producing food (Davies, Titterington,

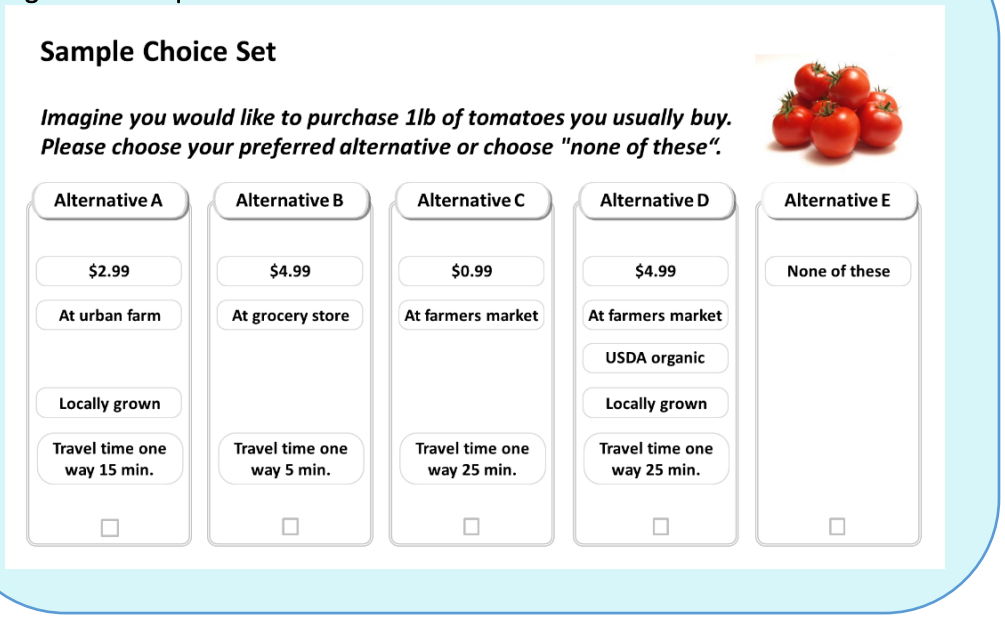
and Cochrane, 1995; Harper and Makatouni, 2002). For example, Gifford and Bernard (2011) find a relationship between natural and organic, as do Rushing and Ruehle (2013), who state that one of the underlying reasons for increasing demand for organic and local food is the opportunity to purchase food options that are (perceived to be) more natural and healthier. Finally, given that consumers increasingly prefer locally produced food (Loureiro and Hine, 2002; Naspetti and Bodini, 2008; Costanigro et al., 2011; Meas et al., 2014), we test whether produce labeled as "local" will be preferred more by those consumers who are biased toward perceiving certain production methods as more natural compared to others.

What is Perceived Naturalness?

Most consumers prefer "natural" food that has been produced without synthetic or modified inputs (Rozin et al., 2004). This preference can be motivated by the combination of instrumental and ideational beliefs. Instrumental beliefs include the belief that natural is better because the product was not altered or created by people and because it is healthier, superior, and purer, making it safer for consumption. At the same time, ideational beliefs include the belief that natural is just better by default. Rozin (2006) suggests that the process that a certain food undergoes is the most important influencer of the judgment of naturalness. In our case, consumers might think that produce from urban farms is grown more naturally—for example, without the use of pesticides—whether that is true or not. If so, they might believe that this produce is healthier and consequently develop a preference for it. Furthermore, consumers might prefer produce from urban farms over produce sold at grocery stores because studies show an increasing uncertainty about the nutritional value of food produced by multinational firms (Adams and Salois, 2010).

Finally, an underlying reason for consumers' positive perceptions and preferences for produce from urban farming may be the "halo effect," which is a tendency to use an existing opinion about a person or an object to make additional assumptions and judgments about that person or object (Smith, Read, and López-Rodríguez, 2010). In the context of the current research, the halo effect is a process in which an initial perception about the way products are grown at urban farms (for example, being "pesticide free") affects perceptions about other attributes of the products grown and/or produced at these venues, such as their naturalness, healthiness, and freshness. Based on this, we hypothesize that produce from urban farms might benefit from a halo effect and, therefore, will be more preferred by consumers. Furthermore, we hypothesize that perceiving urban farming as natural will enhance this effect, given that Rozin (2005) found that the production process of food has the greatest influence on consumers' judgments of naturalness.

Figure 1: Example of Choice Set



Examining Consumer Preferences

To test the influence of perceived naturalness on consumer preferences for produce from urban farms, we conducted an online survey in Spring 2016 that included 173 student participants. About 45% of the respondents were female, with an average household size of three and an average household income of $48,650. In order to simulate purchase decisions, we used a choice experiment in which participants were asked to choose a product (in this case, 1 pound of tomatoes) from a set of alternatives. This allows us to determine their preferences for certain product attributes.

Our experimental design contained 36 choice sets. In order to avoid participant fatigue (Savage and Waldman 2008), we divided the choice sets into four blocks. Each participant was randomly assigned one of the blocks, so that each participant answered only nine choice sets. Each choice set asked participants to choose from among four alternatives. Participants were also provided with an option to not purchase any of the alternatives ("none-of-these").

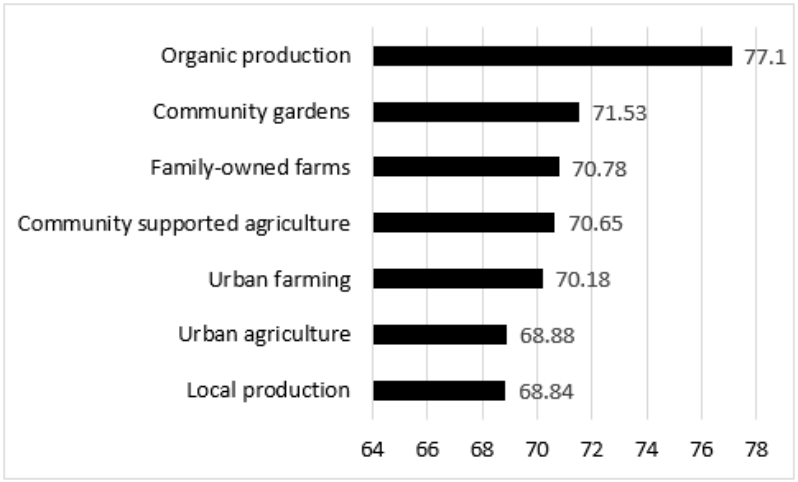
Our study included five attributes—price, local production, organic certification, retailing outlet, and distance to reach the outlet. The price attribute included three levels chosen based on current prices for fresh tomatoes. Since distance to reach the outlet is strongly related to food shopping convenience (e.g., Briesch, Chintagunta, and Fox, 2009), it was included in the study in terms of the time needed to travel to the store (but not to return from the store). A retailing outlet attribute reflected different venues where tomatoes can be purchased (grocery stores, farmers' markets, and urban farms). Finally, organic or local production labels were either present or absent on the alternatives. Since no formal definition of local food is available to consumers (Onken, Bernard, and Pesek, Jr., 2011; Meas et al., 2014), we followed Lim and Hu (2013) and did not provide participants with a definition for "locally grown," allowing them to use their own beliefs about what constitutes "local." Figure 1 provides an example choice set.

Perceived Naturalness of Production Methods

In order to measure perceived naturalness, we followed the approach used by Rozin (2005, 2006). Participants had to consider the naturalness of different ways of producing food and rate their naturalness on a scale from 0 (not natural at all, like a plastic toy model of a car) to 100 (completely natural, like a tree growing on a mountain peak that has never been visited by humans). We included seven production methods: (i) organic production, (ii) local production, (iii) community gardens, (iv) family-owned farms, (v) community supported agriculture (CSA); (vi) urban farming, and (vii) urban agriculture.

Figure 2 displays the ratings, ranging from 68 to 77, which show that local production is generally perceived to be least natural, with a mean of 68.84. Urban agriculture is rated similarly at 68.88. Urban farming, community supported agriculture, and family-owned farms all range around 70. Community gardens are perceived to be slightly more natural at 71.53. Organic production is perceived to be most natural at 77.10. These ratings are consistent with previous research that also found a high score for organic production (Rozin, 2005).

Figure 2: Consumer Perception of Naturalness of Different Production Methods (Scale of 1-100)



Perceived Naturalness Index

To further our investigation, we created a *Perceived Naturalness Index*, an average of the perceived naturalness measures for the seven different production methods equal to 71. We then split participants into two groups, with strong and weak *Perceived Naturalness*, as indicated by the index. We assume that participants with a *Perceived Naturalness Index* greater than or equal to 71 perceive tested production methods to be natural, while participants with an index of less than 71 do not perceive the tested production methods to be very natural. Similarly, using the mean of 70, we split participants into two groups based on their strong and weak perception of *urban farming being natural*. Finally, since organic production was rated as the most natural way to produce food, we split

participants into two groups based on their strong and weak perception of organic production being natural. The mean of *perceived naturalness of organic production* was 77.

Does Perceived Naturalness Bias Consumer Preferences?

We use six mixed logit models to analyze the choice experiment data (for further information, see Train, 2009). The first two models we estimate investigate differences in consumer preferences based on perceived "naturalness" of various production methods (Perceived Naturalness Index). Furthermore, models three through six estimate consumer preferences based on perceived naturalness of organic production and perceived naturalness of urban farming.

A number of findings are consistent across models. For example, consumers are less likely to prefer tomatoes from an urban farm compared to tomatoes from the grocery store, but they do not have a significantly different preference for tomatoes sold at the farmers' market. This could be because consumers expect to get a better value for their money when shopping at the grocery store.

Though there are not many differences between the models based on the Perceived Naturalness Index, one substantial difference in consumer preferences becomes evident in the last four models, which compare participants' perceived naturalness of organic production and urban farming. The results suggest that consumers who strongly perceive organic production and urban farming to be natural have a significant and positive preference for local tomatoes. On the other hand, participants who weakly perceive those production methods to be natural do not differentiate between local and non-local tomatoes. One explanation for this could be that consumers who strongly perceive organic production to be natural might believe that local food possesses the benefits of organic production (Naspetti and Bodini, 2008; Onozaka, Nurse, and Thilmany McFadden, 2010). Another explanation might be that consumers who strongly perceive urban farming to be natural believe that food labeled as local comes from farms located within city limits. This seems to be supported by the fact that—even though an official USDA definition is available of what constitutes organic food—there is still no official definition of local food (Onken, Bernard, and Pesek, Jr., 2011; Meas et al., 2014).

The results also indicate that consumers have heterogeneous preferences, as suggested by significant standard deviation estimates (Hensher, Rose, and Greene, 2005). However, these preferences vary between participants with weak and strong perceptions about naturalness. Significant standard deviation estimates for urban farm and farmers' market show preference heterogeneity, with some consumers having significantly higher or significantly lower preferences for a product with these attributes, implying that taste heterogeneity exists among consumers with strong perceived naturalness, but there is no difference among consumers with weak perceived naturalness. Similarly, we find that tastes for local production differ among consumers who weakly perceive organic production or urban farming to be natural. This also holds for consumers with weak general perceptions about naturalness.

In Summary

Urban farming is the latest movement in food production, transforming vacant lots in cities into agricultural landscapes. However, for urban farming to be successful, consumers have to prefer it as a source of produce over other retail outlets. This research investigated consumer preferences for tomatoes sold at different retail outlets while considering perceived naturalness of production methods. Our findings can provide insight for farmers and marketers when developing a pricing strategy for their products or identifying their target market. More specifically, our research highlights one of the motivations for buying local food from urban farms—perceived naturalness.

What becomes evident from our results is that, on average, consumers with strong or weak perceptions about naturalness do not vary much in their preferences. However, we do find that consumers who perceive organic production and urban farming to be natural have strong preferences for local food, suggesting that urban farms might benefit greatly by catering to consumers with high interest in organic production and those who consider urban farms to be a natural way of producing food.

Future studies might investigate how perceived naturalness affects consumers' willingness to pay for local food. Also, future research could test whether consumer preferences as they relate to perceived naturalness differ between various types of local food products, such as processed and unprocessed food or produce and animal products such as dairy, eggs, and meat. Finally, future research could study how the actual retail outlet influences preferences of consumers for choosing locally produced food. This seems a promising avenue for research given that previous literature (Ellison et al., 2016a; Ellison et al., 2016b) has identified that retailing venues have a significant effect on consumer perceptions and willingness to pay for organic food.

For More Information

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: 331–341.

Armstrong, D. 2000. "A Survey of Community Gardens in Upstate New York: Implications for Health Promotion and Community Development." *Health & Place* 6: 319–327.

Bailkey, M., and Nasr, J. 1999. "From Brownfields to Greenfields: Producing Food in North American Cities." *Community Food Security News* Fall 1999/Winter 2000*:* 6–8. Available online: http://foodsecurity.org/uploads/BrownfieldsArticle-CFSNewsFallWinter1999.pdf

Briesch, R. A., P. K. Chintagunta and E. J. Fox. 2009. "How Does Assortment Affect Grocery Store Choice?" *Journal of Marketing Research* 46: 176–189.

Costanigro, M., D. Thilmany McFadden, S. Kroll, and G. Nurse. 2011. "An In-Store Valuation of Local and Organic Apples: The Role of Social Desirability." *Agribusiness* 27: 465–477.

Davies, A., A. J. Titterington, and C. Cochrane. 1995. "Who Buys Organic Food? A Profile of the Purchasers of Organic Food in Northern Ireland." *British Food Journal* 97: 17–23.

Ellison, B., J. C. Bernard, M. Paukett, and U. C. Toensmeyer. 2016a. "The Influence of Retail Outlet and FSMA Information on Consumer Perceptions of and Willingness to Pay for Organic Grape Tomatoes." *Journal of Economic Psychology 55: 109–119.*

Ellison, B., B. R. Duff, Z. Wang, and T. B. White 2016b. "Putting the Organic Label in Context: Examining the Interactions between the Organic Label, Product Type, and Retail Outlet." *Food Quality and Preference* 49: 140–150.

Gifford, K., and J. C. Bernard. 2011. "The Effect of Information on Consumers' Willingness to Pay for Natural and Organic Chicken." *International Journal of Consumer Studies 35*: 282–289.

Harper, G. C., and A. Makatouni. 2002. "Consumer Perception of Organic Food Production and Farm Animal Welfare." *British Food Journal 104*: 287–299.

Hensher, D. A., J. M. Rose, and W. H. Greene. 2005. *Applied Choice Analysis: A Primer*. Cambridge: Cambridge University Press.

Kolodinsky, J. M., and L. L. Pelch. 1997. "Factors Influencing the Decision to Join a Community Supported Agriculture (CSA) Farm." *Journal of Sustainable Agriculture* 10(2–3): 129–141.

Lim, K. H., and Hu, W. 2013. "How Local Is Local? Consumer Preference for Steaks with Different Food Mile Implications." Paper presented at the annual meeting of the Southern Agricultural Economics Association, February 3–5, Orlando, Florida.

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 34*: 477–488.

Lusk, J. L., and T. C. Schroeder. 2004. "Are Choice Experiments Incentive Compatible? A Test with Quality Differentiated Beef Steaks." *American Journal of Agricultural Economics* 86: 467–482.

Meas, T., W. Hu, M. T. Batte, T. A. Woods, and S. Ernst. 2014. "Substitutes or Complements? Consumer Preference for Local and Organic Food Attributes." *American Journal of Agricultural Economics* 97: 1044–1071.

Naspetti, S., and A. Bodini. 2008. "Consumer Perception of Local and Organic Products: Substitution or Complementary Goods?" *The International Journal of Interdisciplinary Social Sciences* 3: 111–122.

Onken, K. A., J. C. Bernard, and J. D. Pesek, Jr. 2011. "Comparing 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: 33–47.

Onozaka, Y., G. Nurse, and D. Thilmany McFadden. 2010. "Local Food Consumers: How Motivations and Perceptions Translate to Buying Behavior." *Choices 25*(1): 1–6.

Rozin, P. 2005. "Meaning of 'Natural': Process More Important than Content." *Psychological Science 16*: 652–658.

Rozin, P. 2006. "Naturalness Judgments by Lay Americans: Process Dominates Content in Judgments of Food or water Acceptability and Naturalness." *Judgment and Decision Making* 1(2): 91–97.

Rozin, P., M. Spranca, Z. Krieger, R. Neuhaus, D. Surillo, A. Swerdlin, and K. Wood. 2004. "Natural Preference: Instrumental and Ideational/Moral Motivations, and the Contrast between Foods and Medicines." *Appetite* 43(42): 147–154.

Rushing, J. and J. Ruehle. 2013. *Buying into the Local Food Movement*. New York: A. T. Kearney. Available online: https://www.atkearney.com/documents/10192/709903/Buying+into+the+Local+Food+Movement.pdf/68091049-b5c2-4d2a-a770-ee5b703da8fd

Saher, M. 2006. *Everyday Beliefs about Food and Health*. Helsinki: Yliopistopaino.

Savage, S. J., and D. M. Waldman. 2008. "Learning and Fatigue during Choice Experiments: a Comparison of Online and Mail Survey Modes." *Journal of Applied Econometrics* 23: 351–371.

Siipi, H. 2013. "Is Natural Food Healthy?" *Journal of Agricultural and Environmental Ethics* 26: 797–812.

Smith, N.C., D. Read, and S. López-Rodríguez. 2010. "Consumer Perceptions of Corporate Social Responsibility: The CSR Halo Effect." Working paper, Social Innovation Centre, INSEAD, Fontainebleau, France. Available online: http://www.insead.edu/facultyresearch/research/doc.cfm?did=43990

Train, K. E. 2009. *Discrete Choice Methods with Simulation*. Cambridge: Cambridge University Press.

Umberger, W. J., D. D. Thilmany McFadden, and A. R. Smith. 2009. "Does Altruism Play a Role in Determining US Consumer Preferences and Willingness to Pay for Natural and Regionally Produced Beef?" *Agribusiness* 25: 268–285.

University of California, Urban Agriculture. 2016. *What Is Urban Agriculture?* Davis, CA: University of California, Division of Agriculture and Natural Resources. Available online: http://www.ucanr.edu/sites/UrbanAg/What_is_Urban_Agriculture

U.S. Department of Agriculture. 2016. *Urban Agriculture*. Washington, D.C.: U.S. Department of Agriculture. Available online: http://www.usda.gov/wps/portal/usda/knowyourfarmer?navid=kyf-urban-agric

U.S. Department of Agriculture, National Agricultural Library. 2016. *Urban Agriculture*. Washington, D.C.: U.S. Department of Agriculture, National Agricultural Library. Available online: http://www.nal.usda.gov/afsic/urban-agriculture

Author Information

Iryna Printezis (iiermole@asu.edu) is Ph.D. Student, Morrison School of Agribusiness, W.P. Carey School of Business, Arizona State University, Mesa, AZ.
Carola Grebitus (carola.grebitus@asu.edu) is Assistant Professor of Food Industry Management, Morrison School of Agribusiness, W.P. Carey School of Business, Arizona State University, Mesa, AZ.
Antonios Printezis (printezis@asu.edu) is Associate Clinical Professor of Supply Chain Management, Department of Supply Chain Management, W. P. Carey School of Business, Arizona State University, Tempe, AZ.

Acknowledgements: This work was supported by EASM-3: Collaborative Research: Physics-Based Predictive Modeling for Integrated Agricultural and Urban Applications, USDA-NIFA, Grant No. 2015-67003-23508 and EASM-3: Collaborative Research: Physics-Based Predictive Modeling for Integrated Agricultural and Urban Applications, NSF-MPS-DMS, Award Number: 1419593.