The Direct and Indirect Effects of 'Locally Grown' on Consumers' Attitudes towards Agri-Food Products

Domenico Dentoni, Glynn T. Tonsor, Roger J. Calantone, and H. Christopher Peterson

Recent agricultural economics literature has largely analyzed consumers' willingness to pay (WTP) for many credence attributes, including place of origin, organic, locally grown, environment-friendly, fair trade, and animal welfare. In this study, we instead attempt to analyze *why* consumers value "locally grown," which is a credence attribute receiving increasing attention in the market. Specifically, we propose a distinction between the direct effect and the indirect effect of "locally grown" on consumers' attitudes towards agri-food products to explain consumers' preferences for locally grown products. We collect data from an experiment with university students and analyze the data with a structural equation modeling methodology.

Key Words: credence attributes, locally grown, inferences, attitudes.

Growing segments of world consumers seek improved quality, healthiness, and variety in their food (Verbeke 2005, IDDBA 2008). Accordingly, demand for agri-food products with credence attributes (e.g., place of origin, organic, locally grown, environment-friendly, and fair trade) is increasing rapidly (Nimon and Beghin 1999, Loureiro and Umberger 2007, Basu and Hicks 2008, Darby et al. 2008, Kanter, Messer, and Kaiser 2008, Froelich, Carlberg, and Ward 2009). This growing consumer demand has resulted in an extensive literature, studying a range of issues with credence attributes. Many studies suggest that credence attributes have an impact on some consumer groups' buying intentions, specifically on the amount they are willing to pay to acquire products. However, examining *why* consumers are willing to pay a premium price for credence attributes is notably less prevalent in the literature. For example, Lusk et al. (2006) recognized this in the context of country-of-origin labeling. In this study, we aim to begin filling this gap by analyzing consumers' motivations for buying agri-food products that are "locally grown." We clarify whether consumers are willing to pay a premium for "locally grown" products because they value the "locally grown" attribute itself, or because they mainly value "locally grown" as a signal of other desirable product attributes, such as freshness or its environmental friendliness.

To disentangle consumers' motivations for buying "locally grown" products, we propose and test a model that separates the direct effect from the indirect effect of "locally grown" on consumers' attitudes towards a product. Similar to the distinction suggested by Van der Lans et al. (2001), we define *direct effect* as the impact of "locally grown" on consumers' attitudes towards a product, without any mediation. We instead define *indirect effect* as the impact of "locally grown" on consumers' attitudes towards a product mediated by their belief

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that other desirable product attributes (e.g., freshness or environmental friendliness) are present in the product. These product attributes that are inferred from "locally grown" may be either experience attributes, which are features that can be verified by the consumer after disposal, or other credence attributes. For example, some consumers may value "locally grown" as a cue of product freshness, which is an experience attribute, or as a cue of environmental friendliness, which is another credence attribute.

We suggest that, along with "locally grown," any other credence attribute may have a direct and indirect effect on consumers attitudes towards a product. For example, some consumers may value the attribute "animal welfare" as a positive cue of desirable "food safety" (which is, according to our definition, an example of an indirect effect), while others may value the attribute "animal welfare" itself, because they really care about the welfare of animals (which is an example of a direct effect). Similarly, some consumers may be willing to pay a premium for food "from France," either because they believe that "from France" is a cue for "good flavor" or because they have a positive reaction associated with the idea of France. Therefore, we suggest that the model applied to "locally grown" in this paper can be possibly tested also on other credence attributes.

Exploring whether "locally grown" and other credence attributes have a direct or indirect effect on consumers' attitudes towards a product has important implications for marketers, public agencies, and nongovernmental organizations. Marketers who understand why potential consumers are willing to pay a premium for credence attributes can make their consumer-targeting strategies more effective. Public agencies and nongovernmental organizations that aim toward shifting consumer demand and enhancing consumption of products with credence attributes for social welfare reasons could use the model proposed in this paper to assess the effectiveness of their promotion and awareness programs.

The conceptual framework we propose is based upon the theory of attitude formation, developed in psychology (Fishbein 1967, Fishbein and Ajzen 1975); adapted to marketing theory (Lutz 1991); and applied in a wide range of marketing contexts (e.g., Hoffman and Novak 1996, Huang 1996, Lee 2000). Differing from existing economic theories on signaling quality as a unique concept (Akerlof 1970, Rosenman and Wilson 1991), the theory of attitude formation enables us to study the problem of signaling individual quality attributes by analyzing the relationships among consumers' beliefs in the presence of product attributes and consumers' attitudes towards a product (Fishbein 1967). To test our conceptual framework, we collected data from 60 students in an experiment regarding "locally grown" apples. We chose structural equation modeling as the appropriate methodology to separate the direct from the indirect effect of "locally grown" on consumers' attitudes towards apples.

The rest of this paper is organized as follows. In the next section, we review the existing literature and propose our conceptual framework. Then, we develop and state our hypotheses. After this, we describe our methods and present our results. In the last section, we draw our conclusions from the results illustrated.

Literature Review

Credence Attributes

Credence attributes are quality features of a product or service that cannot be verified by consumers before purchase or after trial (Darby and Karni 1973). Credence attributes have different properties from search and experience attributes, as these are features that consumers can verify before purchase and after purchase, respectively, when the product is used (Nelson 1970). On the other hand, consumers cannot know with certainty if a credence attribute is present within a product or service, as they do not possess the technical expertise to make an assessment. In the context of food products, credence attributes can be either features of the production process (i.e., country of origin or organic practices) or of the chemical structure of a product material (i.e., calorie content or the presence of chemical residues).

Both the agricultural economics and marketing literatures have largely examined the impact of several credence attributes on consumers' intentions of buying products and services. Since the 1980s, a vast strand of the marketing literature has focused on the impact of "country of origin" attrib-

utes on consumers' evaluation of products (Peterson and Jolibert 1995, Verlegh and Steenkamp 1999, Pharr 2005). These studies found that the impact of "country of origin" on consumer evaluations is significant in many circumstances. More recently, the agricultural economics literature has analyzed the impact of several credence attributes, including "genetically modified" (Baker and Burnham 2001, Lusk, Roosen, and Fox 2003); "organic" (Thompson 1998, Kanter, Messer, and Kaiser 2008); "local" or "locally grown" (Darby et al. 2008, Froelich, Carlbert, and Ward 2009); "environment-friendly" (Nimon and Beghin 1999, Loureiro, McCluskey, and Mittelhammer 2002); "place of origin" (Van der Lans et al. 2001, Alfnes and Rickertsen 2003, Loureiro and Umberger 2005 and 2007, Ehmke, Lusk, and Tyner 2008); "fair trade" (De Pelsmacker, Driesen, and Rayp 2005, Basu and Hicks 2008); and "hormone-free" (Alfnes and Rickertsen 2003, Kanter, Messer, and Kaiser 2008) on consumers' willingness to pay for agri-food products.

From these studies, researchers have found that the impact of many credence attributes, such as the presence of procedures guaranteeing safety (Schroeder et al. 2007), on consumers' buying intentions has a positive direction. However, they have also found that the impact of other credence attributes, such as "genetically modified" (Lusk et al. 2001), is sometimes negative. Researchers have often estimated the magnitude of the impact of credence attributes on consumers' willingness to pay (e.g., Alfnes and Rickertsen 2003, Lusk, Roosen, and Fox 2003). Furthermore, some researchers have found that credence attributes have a positive impact on consumers' attitudes towards a product (e.g., Ericksson, Johansson, and Chao 1984), which in turn have a positive effect on consumers' buying intentions (Fishbein and Ajzen 1975). Finally, researchers have analyzed how the impact of credence attributes on consumers' attitudes and buying intentions vary according to consumers' characteristics, such as their nationality (Tonsor et al. 2005, Basu and Hicks 2008, Ehmke, Lusk, and Tyner 2008); level of income (Thompson 1998, Pharr 2005); and level of knowledge of the attribute (Baker and Burnham 2001).

While much research has focused on measuring the magnitude and the direction of the impact of credence attributes on consumers' buying intentions, a question that has not been tackled systematically is *why* do credence attributes have such an impact? One way to frame this broad question is to analyze whether consumers value credence attributes because they are cues of other desirable attributes or because they are desirable on their own. In order to analyze this specific question, we propose a conceptual framework that builds upon the learning theory of attitude formation (Fishbein 1967).

Consumers' Beliefs and Consumers' Attitudes towards a Product

There is a broad strand of the literature in consumer psychology that analyzes the relationship among consumers' beliefs in the presence of product attributes to their attitudes towards a product and their willingness to pay for it (Fishbein 1967, Fishbein and Ajzen 1975, Ajzen 1991, Eagly and Chaiken 1993, Ajzen 2005). Specifically, the learning theory of attitude formation elaborated by Fishbein (1967) establishes the relationship between a person's beliefs in the presence of individual attributes of an object and his overall attitude towards that object. An attitude towards an object is defined as a "psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly and Chaiken 1993). There is substantial evidence that a person's attitude towards an object is positively associated with actions involving that object, even if there are social and personal factors that might weaken or eliminate this relationship (Fishbein and Ajzen 1980, McFadden 1986).

In particular, the learning theory states that a person's attitude towards an object is the sum of his evaluative judgments for each attribute of the object times a consumer's belief strength that each attribute is actually in place. In formula, the attitude towards an object is given by:

$$Attitude\,(Object) = \sum_{i=1}^{n} e_i\, b_i \tag{1}$$

where i is an attribute of an object, n is the total number of attributes of the object, e_i is a person's evaluative judgment for the attribute i, and b_i is a person's belief strength that attribute i is actually in place in the object. Both e_i and b_i can be thought of

as a scale of values, rather than a "yes/no" value. A person's evaluative judgment for an attribute represents how much he cares about the presence of that attribute, while a person's belief strength represents how much he believes that the attribute is actually present within that object.

The learning theory of attitude formation has lent itself to marketing theory (Lutz 1991) and has found application in a wide range of marketing contexts (e.g., Hoffman and Novak 1996, Huang 1996, Lee 2000). Consumers build their attitudes towards a product upon their own beliefs and evaluative judgments for each attribute of that product. Then, consumers make their buying decisions by comparing their attitudes towards competing products and by taking into account other personal and social factors that might influence their decision (Fishbein and Ajzen 1980). From this perspective, marketing communication strategies have the goal of making consumers' attitudes for their product greater than the consumers' attitudes towards competing products (Lutz 1991). To do that, marketers have to decide whether they aim at changing consumers' evaluative judgments for specific attributes or at changing their beliefs that a specific attribute is in place. To make this fundamental choice, it is crucial that marketers have an understanding of how their own product attributes are perceived by consumers differently from the product attributes of their competition.

Direct and Indirect Effects of Credence Attributes on Consumers' Attitudes

The impact of product attributes as signals, or cues, of consumers' perceptions of quality has been an important field of research in consumer psychology. Consumers use attributes as cues when information is incomplete or difficult to obtain (Olson 1978, Ericksson, Johansson, and Chao 1984, Han and Terpstra 1988, Rao and Monroe 1989, Kirmani and Rao 2000). In this study, we hypothesize that credence attributes have an impact on consumers' attitudes also because they are used as a cue of desirable experience attributes and other credence attributes.

Some research on the use of the credence attribute "country of origin" as a cue of other attributes has been already conducted in the marketing literature, while comparatively little work in this area has been done in the agri-food marketing field (Lusk et al. 2006), with few exceptions (Umberger et al. 2003, Loureiro and Umberger 2005). There is evidence that the country of origin associated with a product has an important function in increasing consumers' beliefs in the presence of other experience attributes (e.g., Ericksson, Johansson, and Chao 1984, Han and Terpstra 1988, Hong and Wyer 1989). For example, U.S. consumers considered televisions (TVs) made in Japan more technologically advanced than domestic TVs (Han and Terpstra 1988). The effect of place of origin as a cue of other attributes has been defined by Van der Lans et al. (2001) as an indirect effect, as the impact of credence attributes on consumers' willingness to pay for a product is mediated by consumers' perceived quality. Similarly, in this study, we propose that the effect of credence attributes on consumers' attitudes can be defined as "indirect" when it is mediated by consumers' beliefs in the presence of individual product attributes. Some researchers have found that the impact of place of origin of a product on consumers' attitudes is given only by the indirect effect as a mediation of consumers' beliefs in the presence of experience attributes (e.g., Ericksson, Johansson, and Chao 1984).

Other researchers found that the idea of a place of origin on its own, when attached to a product, can generate consumers' positive affective feelings for the product (Johansson and Nebenzahl 1986, Van Ittersum, Candel, and Meulenberg 2003, Verlegh and Steenkamp 1999). These affective feelings are sometimes based on retrieval of personal past experience with the place of origin (Obermiller and Spangenberg 1989, Li and Wyer 1994), while sometimes the place of origin can contribute to the creation of a consumer's self-image (Keller 1998). In these circumstances, Van der Lans et al. (2001) claim that the place of origin has a direct effect on consumers' attitude towards a product, which means that the place of origin has an impact on consumers' attitudes towards a product without any mediation.

Similarly, in this study, we propose that the effect of credence attributes on consumers' attitudes can be defined as "direct" when there is no mediation in this relationship. Van der Lans et al. (2001) found that direct and indirect effects of region-of-origin attributes can coexist. However, other studies have found that place of origin has sometimes no direct effect at all (Ericksson, Johansson, and Chao 1984).

The Moderation Effect of Consumers' Familiarity with the Product

Consumers' familiarity with a product is "the number of product-related experiences that have been accumulated by the consumer" and is a major component of product knowledge (Alba and Hutchinson 1987). Familiarity with a product influences how a person searches for, uses, and recalls information about that product (Park and Lessig 1981, Punj and Staelin 1983, Johnson and Russo 1984).

Researchers found that consumers with different levels of product familiarity use different cues to form their beliefs about the quality of a product (Rao and Monroe 1988). Specifically, consumers with a lower familiarity with the product use cues that are extrinsic to the product (Olson 1978). For example, a consumer having a low familiarity with wine is more inclined to evaluate quality from cues such as price, country of origin, or the name of the wine. In other words, consumers who are not familiar with a product tend to use country of origin as a stereotype to evaluate a product, as they do not know how to obtain more accurate information (Bodenhausen and Lichtenstein 1987). On the other hand, consumers having a greater familiarity with the product make more use of cues that are intrinsic to the product, such as a wine's color or flavor (Rao and Monroe 1988). The theory of the consumers' familiarity with a product (Rao and Monroe 1988) leads us to hypothesize that the indirect effect of credence attributes, which are extrinsic cues, may vary according to the level of consumers' familiarity with a product.

Conceptual Framework and Hypotheses

To explore why credence attributes have an impact on consumers' attitudes, our conceptual framework builds upon the theory of attitude formation (Fishbein and Ajzen 1975); the theory of direct and indirect effects of place-of-origin attributes (Van der Lans et al. 2001); and the theory of consumers' familiarity with a product (Rao and Monroe 1988) (Figure 1). In this study, we test our conceptual framework within the specific context of "locally grown" attributes.

Given the nature of credence attributes as being verifiable by the consumer neither before nor after disposal, we first distinguish between the seller's credence claim and the buyers' beliefs that the credence attribute is actually in place. In the case of "locally grown" attributes, as there is no current

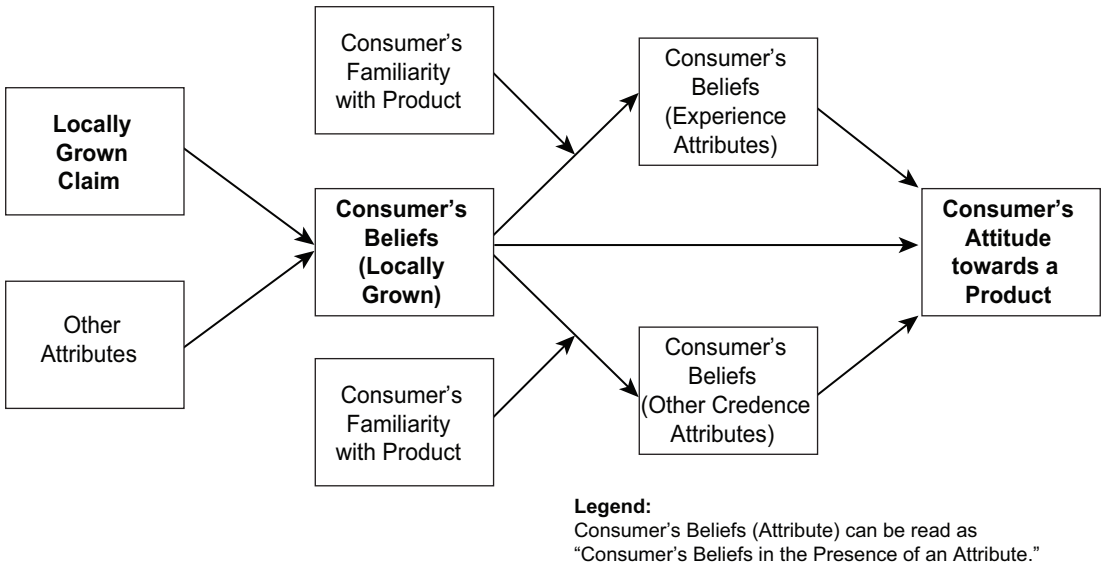

Figure 1. The Direct Effect and the Indirect Effect of Credence Attributes on Consumer's Attitudes

unambiguous definition of what is "local" or not (Darby et al 2008), consumers may perceive some products to be "more locally grown" or "less locally grown." The concept of consumers' beliefs in the presence of the "locally grown" attribute as a scale of values is consistent with the learning theory of attitude formation (Fishbein 1967). Therefore, we propose that sellers' "locally grown" claims and buyers' beliefs are separate variables, and that sellers' claims have an impact on buyers' beliefs. Along with sellers' "locally grown" claims, other attributes, such as the color or the flavor of a product, may have an impact on consumers' beliefs in the presence of the "locally grown" attribute. In this study, we do not test this proposition but do recognize this as an area for valuable future research.

Second, given the existing evidence from the place-of-origin literature (Van der Lans et al. 2001), we hypothesize that "locally grown" has both a direct effect and an indirect effect on consumers' attitudes towards a product. Previous studies on consumers' preferences for local products provide elements suggesting that "locally grown" may have this dual effect (Darby et al. 2008). Specifically, in Darby et al. (2008), respondents revealed that they value "locally grown" strawberries mainly because they are fresher, but also because they simply like the idea of eating strawberries from their own land of origin. This suggests that the credence attribute "locally grown" is a cue of an experience attribute, such as the freshness, as well as a direct driver of a consumer's attitude towards strawberries. Similarly, we hypothesize that the indirect effect of "locally grown" is mediated by a consumer's beliefs in the presence of other credence attributes, such as "environmental friendliness." In other words, we hypothesize that:

H1. Consumers' beliefs that a product is "locally grown" are positively associated with their attitude towards the product.

H2. Consumers' beliefs in the presence of experience attributes are partial mediators of the effect of consumers' beliefs that a product is "locally grown" on their attitude towards the product.

H3. Consumers' beliefs in the presence of other credence attributes are partial mediators of the effect of consumers' beliefs that a product is "locally grown" on their attitude towards the product.

Finally, on the basis of evidence from the theory of consumers' familiarity with a product (Rao and Monroe 1988), we hypothesize that consumers' familiarity with the product mitigates the indirect effect of "locally grown" attributes on consumers' attitudes towards a product. As shown by Rao and Monroe (1989), a "locally grown" attribute, such as other cues that are extrinsic to the product, is more used by low-familiarity consumers as a stereotype to infer product quality. Similarly, we hypothesize that a "locally grown" attribute is more used by low-familiarity consumers as a stereotype to evaluate the presence of other attributes of a product, such as its flavor or its safety. In other words, we hypothesize that:

H4. Consumer's familiarity with a product mitigates the indirect effect of "locally grown" attributes on consumers' attitude towards the product, mediated consumers' beliefs in the presence of other credence attributes and experience attributes.

Methodology

Sample and Product Selection

To test our hypotheses, data were collected through an online experiment administered to a convenience sample of 60 undergraduate and graduate students enrolled at Michigan State University, East Lansing, Michigan. The experiment was conducted during October and November 2008. Students were recruited in two convenient campus locations. We did not exclude any subgroup from the sample population of students. Out of the students who undertook the questionnaire, 76 percent were graduate students and 24 percent were undergraduates. Males were 59 percent of the sample, while U.S. citizens were only 37 percent of the sample.

We chose "locally grown" apples as the product of interest of our study for several reasons. First,

apples represented a convenient product, as they are cheap and easy to handle in an experimental setting. Second, there exists a wide literature of experiments based on apples that we could use as reference for our research design (e.g., Manalo 1990, DeEll and Prange 1992, Mehinnagic et al. 2003). Third, as the location of this study is a major center for the production and consumption of apples, we assumed that our sample population, on average, was familiar with the expression "locally grown" apples, although not univocally defined. Although 63 percent of the sample was from outside the United States, 70 percent of the students were in the United States for more than one year. Hence, we assume they were likely to have acquired some familiarity with "locally grown" products. For the same reason, we assumed that respondents generally had enough involvement with the product to undertake a fairly complex questionnaire.

Experimental Procedure

Out of these 60 respondents, 20 students undertook a pre-test questionnaire and 40 students completed the final questionnaire.

We performed a pre-test questionnaire to assess which attributes the respondents were most likely to infer from "locally grown" claims. Respondents were first asked to choose up to three experience attributes that they inferred when evaluating a "locally grown" apple, from a list of eight suggested attributes. Second, they were asked to choose up to three credence attributes that they inferred when evaluating a "locally grown" product, from a list of twelve suggested attributes. The lists of suggested experience and credence attributes were created from previous research on consumers' perceptions of attributes related to apples (e.g., Manalo 1990, DeEll and Prange 1992, Mehinnagic et al. 2003). We found that, when they observed a "locally grown" apple, respondents most commonly inferred credence attributes such as "pest- and disease-free," "pesticide- and chemical-free," and "healthy." Also, they most commonly inferred experience attributes such as "firm," "sweet," and having "good flavor." Therefore, in our final experiment we used these three credence attributes and three experience attributes as possible mediators of the relationship between "locally grown" attributes and consumers' attitudes towards apples.

The final experiment involved two treatments with two levels each, giving four stimuli in total. The first treatment is the credence claim that an apple is "locally grown," in which the two levels are the presence or absence of the "locally grown" claim. This treatment has the purpose of creating variation in the respondents' beliefs that the apple is locally grown. The second treatment is the picture of an apple, in which the two levels are the presence or absence of a picture of an apple. The purpose of this treatment is to introduce a control variable in the model that may reduce the effect of the "locally grown" attribute on consumers' beliefs and attitudes towards a product.

Students who agreed to participate in the final experiment were contacted by e-mail and directed to an online experiment, which took on average 15 minutes. First of all, respondents were asked demographic questions (e.g., gender, nationality, student year) and eight questions measuring their familiarity with apples, such as "How frequently do you consume apples, including both at home and away from home?" and "Do you presently have some apples with you at home?". From these eight questions, we computed a familiarity score for each respondent. Therefore, respondents were divided in two groups and each respondent was administered two stimuli, which corresponds to one level for each of the two treatments. As each of the 40 subjects was administered two stimuli, we had a total of 80 observations from the final questionnaire. When the "locally grown" claim was present, respondents were asked to "think about an apple that is claimed to be 'locally grown'." When this treatment was absent, respondents were simply asked to "think about any apple that they would find in their shopping location." When the apple picture was present, respondents were asked to "look at the apple in the picture." When this treatment was absent, there was simply no mention of apple pictures in the questionnaire.

After each stimulus, we measured beliefs in the presence of the "locally grown" attribute. We also measured beliefs in the presence of the other credence and experience attributes that were previously selected in the pre-test. Beliefs were measured with a seven-point Likert-scale question, in which respondents were asked: "To what extent

do you believe that this apple is locally-grown?" Finally, we measured respondents' attitudes towards apples, without any difference across groups. As is commonly used in the literature to assess consumers' attitudes (Eagly and Chaiken 1993), we asked: "How would you describe your attitude towards this apple?" and then asked the respondents to answer on four seven-point Likert scales, namely from bad (1) to good (7); from dislike to like; from negative to positive; and from unfavorable to favorable. At the end of the experiment, each respondent received $10 in compensation.

The Model

Data were analyzed with a structural equation model, based on a system of regressions combining a factor model and a path model. In the factor model, the latent construct "consumers' attitude towards an apple" (*F1*) is hypothesized to be a predictor of the four measurable indicators of attitude: bad/good attitude (*V1*); dislike/like attitude (*V2*); negative/positive attitude (*V3*); and unfavorable/favorable attitude (*V4*). Therefore, we write:

$$V1 = F1 + e_1; \tag{2}$$

$$V2 = F1 + e_2; \tag{3}$$

$$V3 = F1 + e_3; \tag{4}$$

$$V4 = F1 + e_4. \tag{5}$$

In these regressions, e_1 to e_4 are the errors associated to each measured variable *V1* to *V4*.

In the structural model, consumers' beliefs in the presence of the "locally grown" attribute [*B*(*LG*)]; of other credence attributes [*B*(*CredAttr*)]; and of experience attributes [*B*(*ExpAttr*)] are hypothesized to predict the construct "consumers' attitude towards an apple" (*F1*). Moreover, consumers' beliefs in the presence of the "locally grown" attribute are predicted by the seller's credence claim (*LG*); the picture of the apple (*PIC*); and by the consumers' familiarity with apples (*FAM*), as well as by their respective interactions (*LGPIC*; *FAMLG*; *FAMPIC*; *FAMLGPIC*). Finally, consumers' beliefs in the presence of experience and other credence attributes are predicted by their beliefs in the presence of the "locally grown" attribute, by their familiarity with the product and by the picture of the apple, as well as by their interactions. Then, we write:

$$F1 = a_5 B(LG) + \mathbf{b_5}\boldsymbol{B(ExpAttr)} + \mathbf{c_5}\boldsymbol{B(OCredAttr)} + d_5 PIC + e_5; \tag{6}$$

$$B(LG) = a_6 LG + b_6 PIC + c_6 LGPIC + d_6 FAM + f_6 FAMLG + g_6 FAMPIC + h_6 FAMPICLG + e_6; \tag{7}$$

$$\boldsymbol{B(ExpAttr)'} = \mathbf{a_7}\boldsymbol{BLG} + \mathbf{b_7}\boldsymbol{FAM} + \mathbf{c_7}\boldsymbol{PIC} + \mathbf{d_7}\boldsymbol{FAMPIC} + \mathbf{f_7}\boldsymbol{FAMBLG} + \mathbf{e_7}; \tag{8}$$

$$\boldsymbol{B(OCredAttr)'} = \mathbf{a_8}\boldsymbol{BLG} + \mathbf{b_8}\boldsymbol{FAM} + \mathbf{c_8}\boldsymbol{PIC} + \mathbf{d_8}\boldsymbol{FAMPIC} + \mathbf{f_8}\boldsymbol{FAMBLG} + \mathbf{e_8}. \tag{9}$$

In these regressions, $\boldsymbol{B(ExpAttr)}$ and $\boldsymbol{B(OCredAttr)}$ represent 1x3 vectors, as three experience attributes and three other credence attributes are considered in this study. Therefore, $\mathbf{b_5}$ and $\mathbf{c_5}$ are also 1 x 3 vectors, while the predictors of $\boldsymbol{B(ExpAttr)'}$ and $\boldsymbol{B(OCredAttr)'}$ are 3x1 vectors. Finally, e_5 and e_6 represent the errors associated with dependent variables *F1* and *B*(*LG*), while $\mathbf{e_7}$ and $\mathbf{e_8}$ represent the 3 x 1 vectors of errors associated with the dependent variables $\boldsymbol{B(ExpAttr)'}$ and $\boldsymbol{B(OCredAttr)'}$.

Results

Results from the confirmatory factor analysis are presented in Table 1. The latent construct "consumers' attitude towards the apple" loads to each of the four indicators of attitudes that we have proposed, *V1* to *V4*, with a statistical significance at 5 percent. Therefore, the four indicators of consumers' attitudes towards a product are significant reflective measures of the factor "attitudes towards the apple." Moreover, as chi-square = 1.77 with d.f. = 1 such that its p-value = 0.18, there is a good fit of the factor model with the data. Therefore, we conclude that this factor model has convergent validity and we use this "attitude towards apples" construct as the dependent variable in the structural equation model.

Results from the structural equation model are presented in Table 2. After performing the Wald (W) test and the Lagrange Multiplier (LM) tests for

Table 1. Results of the Confirmatory Factor Analysis

Dependent Variable	Independent Variables	Errors	R-squared
V1	.950* F1	.312*	.903
V2	.950* F1	.314*	.902
V3	.941* F1	.340*	.885
V4	.927* F1	.375*	.859

ChiSquare = 1.767 based on 1 d.f.; P-Value = 0.18374
RMSEA = 0.102. 90%, Confidence Interval = (0.000, 0.343)

Legend:

V1 : Bad/Good Attitude Indicator
V2 : Dislike/Like Attitude Indicator
V3 : Unfavorable/Favorable Attitude Indicator
V4 : Unfavorable/Favorable Attitude Indicator
F1 : "Consumer's Attitude towards the Apple" Latent Construct
E1-E4 : Errors

***Statistics significant at 5% level**

respectively dropping and including new free parameters, we decided to fix three parameters to zero. Specifically, we dropped the variables "consumers' familiarity with the product" (*FAM*) and "apple picture" (*PIC*) from the regression on consumers' beliefs in the presence of the attribute "locally grown" (*BLG*), as the W-test indicated that these two variables had no impact on the dependent variable. For the same reason, we dropped the variable "apple picture" also from the regression on consumers' attitude towards the apple (*F1*). This result from the W-test suggests that introducing the variable "picture of an apple" as a control in the model does not reduce the impact of a "locally grown" attribute on consumers' attitudes towards a product.

The overall fit of the structural equation model with the data is low, as chi-square = 1467 with d.f. = 124, such that its p-value < 0.01, while the root mean-square error of approximation (RMSEA) is equal to 0.38. This problem might be caused by the small sample size, which does not guarantee a sufficient power for testing the hypothesis of exact fit of the model with the population. Looking at the specific regressions of the model, sellers' credence claim (*LG*), the apple picture (*PIC*), and respondents' familiarity with apples (*FAM*) do not explain much of the variation of consumers' beliefs in the presence of the attribute "locally grown," as R^2 (*BLG*) = 0.11 only. On the other hand, goodness-to-fit measures of the other regressions of the model indicate that the hypothesized predictors explain a large part of the variance of the respondents' beliefs in the presence of the experience and other attributes, as well as of their attitudes towards the apples.

After evaluating the overall fit of the model, we assess the significance of the individual parameters. From the regression on respondents' beliefs that an apple is "locally grown," we found no variable having a significant impact at the 5 percent statistical significance. From both the regressions on respondents' beliefs in the presence of the experience attributes and of other credence attributes, we found that respondents' beliefs that an apple is "locally grown" (*BLG*) and respondents' familiarity with apples (*FAM*) have a positive impact that is statistically significant at a 5 percent level. However, we found that, in the same regressions, the interaction between these two variables (*BLG* and *FAM*), which is called *FAMBLG*, has a negative impact on respondents' beliefs in the presence of the experience attributes and of other credence attributes. Overall, this means that respondents use the "locally grown" attribute of an apple to infer sweetness, firmness, flavor, and healthiness of an apple, as well as the absence of pests/diseases and absence of chemicals/pesticides in it. However, respondents' familiarity with apples mitigates the use of "locally grown" as a cue of these attributes, as hypothesized (H4). Finally, we found that the visual observation of the apple (*PIC*), while having a negative effect on respondents' beliefs, does not reduce the impact of "locally grown."

From the regression on respondents' attitude towards the apple, we found that consumers' beliefs in the presence of the attributes "locally grown" (*BLG*), absence of pests and diseases (*BPEST*), good flavor (*BGFLAV*), and firmness (*BFIRM*) have a positive impact that is statistically significant at a 5 percent level. Therefore, respondents' beliefs in the presence of both the "locally grown" attribute, experience and other credence attributes [i.e., apples are free of pests and diseases (*BPEST*), have good flavor (*BGFLAV*), and are firm (*BFIRM*)] have a positive impact on attitudes towards the apple. On the other hand, we found the impact of consumers' beliefs in the presence of the attributes healthiness (*BHEAL*), absence of chemical residues (*BCHEM*), and sweetness (*BSWEET*) on respondents' attitude towards apples is not significant at a 5 percent level.

Table 2. Results of the Structural Equation Model

Dependent Variable	Independent Variables	Errors	R-squared
V1	.981* F1	.192*	.963
V2	.980* F1	.198*	.961
V3	.976* F1	.219*	.952
V4	.970* F1	.242*	.941
BLG	.189 LGCLAIM .206 LGPIC .092 FAMLG -.027 FAMPIC -.155 FAMPICLG	.942*	.112
BHEALTH	.404* BLG .237* FAM -.286* PIC .301* FAMPIC -.313* FAMBLG	.719*	.484
BPEST	.339* BLG .269* FAM -.376* PIC .114* FAMPIC .484* FAMBLG	.536*	.713
BCHEM	.535* BLG .220* FAM -.222* PIC .114* FAMPIC -.425* FAMBLG	.652*	.575
BGFLAV	.484* BLG **.316* FAM -.271* PIC .254* FAMPIC -.484* FAMBLG**	.548*	.700
BSWEET	.467* BLG **329* FAM -.370* PIC .244* FAMPIC -.476* FAMBLG**	.506*	.744
BFIRM	.441* BLG **.231* FAM -.435* PIC .349* FAMPIC -.395* FAMBLG**	.542*	.707
F1	.146* BLG .106 BHEAL .265* BPEST -.073 BCHEM .219* BGFLAV .164 BSWEET .230*BFIRM	.486*	.764

Chi-Square = 1467.214, 124 d.f. P-Value = 0.00000 RMSEA= 0.383 90% CONFIDENCE INTERVAL OF RMSEA (.363; .398)

Legend:

V1 : Bad/Good Attitude Indicator
V2 : Dislike/Like Attitude Indicator
V3 : Unfavorable/Favorable Attitude Indicator
V4 : Unfavorable/Favorable Attitude Indicator
F1 : Consumer's Attitude towards the Apple (Latent Construct)
BLG : Consumer's Belief that the Apple is Locally Grown
LGCLAIM : Claim that the Apple is Locally Grown (Treatment)
PIC : Visual Observation of the Apple; LGPIC : Interaction LG and PIC
FAM : Consumer's Familiarity with Apples
FAMPIC : Interaction FAM and PIC
FAMBLG : Interaction FAM and BLG
BHEAL : Consumer's Belief that the Apple is Healthy
BPEST : Consumer's Belief that the Apple is Free of Pests and Diseases
BCHEM : Consumer's Belief that the Apple is Free of Chemicals
BGFLAV : Consumer's Belief that the Apple has a Good Flavor
BSWEET : Consumer's Belief that the Apple is Sweet
BFIRM : Consumer's Belief that the Apple is Firm
E1-E11 and D1: Errors

***Statistics significant at 5% level**

From these results, we therefore find evidence that respondents' beliefs in the presence of the "locally grown" attribute have a direct effect on respondents' attitude towards the apples, and so we find support to our hypothesis H1. On the other hand, we find that respondents' beliefs in the presence of the "locally grown" attribute have an impact on their beliefs in the presence of other credence (*BPEST*) and experience attributes (*BGFLAV* and *BFIRM*) that in turn have an impact on respondents' attitudes towards the apples. In other words, respondents' beliefs in the presence of the experience attributes and of other credence attributes are both partial mediators of the impact of respondents' beliefs in the presence of the "locally grown" attribute on their attitude towards the apple, as hypothesized (H2 and H3).

Conclusions

By analyzing the direct and indirect effects of credence attributes on consumers' attitudes towards a product, this study aims to bring a conceptual and methodological contribution to the existing agricultural economics literature. From a conceptual standpoint, we introduced three novel constructs.

First, by using the learning theory of attitude formation (Fishbein 1967), we introduced the distinction between a seller's credence claim and a consumer's beliefs in the presence of credence attributes. Second, by expanding the theory of the use of country-of-origin attributes as cues of perceived quality (Pharr et al. 2005), we analyzed the consumer's use of credence attributes as cues of other product attributes. Third, by building upon the theory of Rao and Monroe (1988), we defined the role of a consumer's familiarity with the product as a moderator of the use of credence attributes as cues of other product attributes.

From a methodological standpoint, we suggested a quantitative method to separate the direct and the indirect effects of credence attributes on consumers' attitudes towards a product. By doing this, we introduced a more specific definition of the indirect effect of credence attributes compared to the one proposed by Van der Lans et al. (2001). We proposed that the effect of credence attributes on consumers' attitudes towards a product is indirect when mediated by consumers' beliefs in the presence of other product attributes, either credence or experience.

Empirical evidence from this study should be considered preliminary because of the limited sample size. Since a relatively complex model was estimated with 80 observations, we obtained a low power for testing the overall fit of the structural model to the data. In future research, a larger sample should be used to test the overall fit of the model proposed.

Although the power of the test is low, results provide empirical support to the four hypotheses of this study. First of all, consumers' beliefs in the presence of the credence attribute "locally grown" have both a direct and indirect effect on their attitudes towards apples. As regards to the indirect effect, consumers' beliefs in the presence of both experience attributes and other credence attributes act as mediators of this relationship. This confirms but also provides complementary detail to the evidence found by Van der Lans et al. (2001). Furthermore, consumers' familiarity with apples acts as a negative moderator of the impact of their beliefs in the presence of credence attributes as cues of other attributes. This seems consistent with the conclusions by Rao and Monroe (1988), who found that highly familiar consumers use extrinsic cues less than low-familiar consumers.

Results from this study have both managerial and policy implications. On one hand, understanding *why* consumers value credence attributes is crucial for a firm's marketing communication strategies. By knowing whether consumers value a credence attribute on its own or rather use it as a cue of other valued attributes, a marketer can make his communication more effective. On the other hand, public agencies and nonprofit organizations whose purpose is to change people's buying, consumption, and disposal habits can learn from the distinction between direct and indirect effects of credence attributes, as well as from the moderation role of people's familiarity with a product.

Future research in this area should address the following limitations of this study. First of all, this study has not analyzed the drivers of consumers' beliefs in the presence of a credence attribute, focusing only on their effects. Future research should address the impact of other product attributes as a major driver of consumers' beliefs in the presence of credence attributes. Second, this study is limited to the effects of the credence attribute "locally grown," while other credence attributes may behave differently from "locally grown" attributes. By expanding the experiment to a broader set of credence attributes, it would be possible to find and explain differences in the direct and indirect effects of credence attributes on consumers' attitudes towards a product. Third, consumers' personal values, which are largely studied in consumer psychology (e.g., Sheth, Newman, and Gross 1991, Schwartz 1992), may explain a large part of the variation in the magnitude of the direct and indirect effects of credence attributes on consumers' attitudes towards a product. Future research may analyze the role of consumers' personal values as a key moderator of this relationship.

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