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COVID-19 and the Locavores: Investigating the Drivers of US Consumer Preferences for Apples

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Abstract: This study provides insights and best-practice recommendations for marketing managers in the US food retail sector and the horticultural industry. An online survey distributed via a crowd-sourcing platform in 2021 aimed to explore the factors that explained the intentions of US consumers to purchase locally grown apples. The Theory of Planned Behavior was used as a conceptual framework to shape the proposed model. The results emphasize the importance of behavioral, normative and control beliefs as important factors towards attitudes. Subjective norms and perceived behavioral control were also found to be key drivers in understanding behavioral intention. All concepts, with the exception of perceived behavioral control, were found to be significant behavioral predictors.

Keywords: apples; buying local; consumer preferences; theory of planned behavior; United States of America

1. Introduction

The rapid spread of the acute respiratory syndrome coronavirus type 2 (COVID-19) in February 2020 led to a global pandemic resulting in disorder within agricultural food systems around the world, including the US [1–4]. Disease transmission, health mandates, and restrictions resulted in initial stock outs of essential products as US consumers committed to panic buying and hoarding [1,5]. US agricultural supply chains and regular flows from material suppliers to final consumers were disrupted by the increased cost of freight, the absence of sufficient labor, and the late arrival of cargo delivering imported products [4,6]. These disruptions caused supply uncertainties for consumers, who in turn began to question where their food was grown and how it was being delivered, demonstrating an erosion in their trust towards the global food system. The trend of online buying from local suppliers intensified as a direct consequence of these events [7–9]. This shift towards buying local produce online, as opposed to buying directly from the producer was a trend that could be seen in US Department of Agriculture [USDA] Agricultural Census data as early as 2012 [10].

In the US, local food is commonly associated with community-supported agriculture, farmers markets, and buying directly from the farm gate of local growers [11–13]. Local food is also available via local food retailers, which is advantageous because it allows local growers to have lower unit costs of production and fewer marketing transactions [14].

Since COVID-19, the online outlets offering local food directly to consumers have become more prominent, largely because online shopping is able to offer contactless delivery, click and collect options, or shopping experiences that maintain physical distancing requirements [6,15]. Buying local is not a new trend in the US market; it has been promoted by the US Government for over 70 years, often under the banner of maintaining healthy diets, food safety/security, and support for local growers [13]. Buying local has also gained

support because consumers believe that it is more sustainable and has reduced adverse environmental impacts [16].

As consumer awareness of sustainability problems within the mass production of food has increased, it is important to remember that buying local food was already gaining in popularity even before the occurrence of COVID-19 [17,18]. Consumers have associated buying local with factors such as better customer service, and the ability to purchase sustainably or organically produced food. This has also been augmented by local growers being able to provide fresher, safer and healthier products, while in turn the end consumer has been able to develop a personal rapport with the grower [17–19]. Since the occurrence of COVID-19, the aspect of social interaction and the desire to support the local economy seems to have intensified, as consumers feel altruism towards local growers and their community. While most studies outline these aspects as beneficial, Winfree and Watson (2021) caution that there are competing communities as well as global efforts to buy more local products. For example, if producers cannot depend on the sale of their produce to other markets, and their local market does not provide sufficient demand, local producers could suffer [20].

Whilst extant research shows that there is an agreement on consumer motivations towards buying local food [17–19], there is a lack of consensus regarding the definition of local food within the literature. Existing definitions commonly refer to a radius of between 300 and 400 miles as being the definition of local [13,18], while other definitions refer to a 10–50 mile radius, driving hours or state borders [18]. The shorter distance and the connection with the state where the food is produced allows consumers to know how and where their food is produced [13,18]. In the US, local fruits such as apples are grown in 32 states, with Washington, New York, Michigan, Pennsylvania and California being recognized as the five leading production states [17,21] The products from these states often indicate their origin through State labels, such as Washington grown apples, or are certified by USDA labels. Within these top five states, there are different orchard types, which include traditional orchards, pick-your-own or robot-ready apple orchards [22–26]. In all types of orchards, traditional and club varieties are produced [24–26]. In addition to these traditional and modern varieties, buying local apples is also associated with old and rare varieties such as heirloom apples [27–29]. Heirloom apples are known for their diversity in taste, color, use and their nutritional value [30]. Efforts have been made to conserve a number of varieties as they are valuable for cultural and ethnic reasons as well as culinary purposes [31–33]. This includes the re-creation of dishes that are passed from generation to generation; they are also used to obtain new flavors for juice and cider production [33] Heirloom varieties foster biodiversity and are important for their genetic diversity and resistance to widespread diseases [34].

Consumer preferences and the willingness of consumers to pay for local apples in pre-COVIDian times has been well-explored [21,26]; however, recent studies focusing on local apples are now widely unavailable. Apples belong to the most important fruit category in the US market, and consumption patterns of apples and other fresh produce appear to have changed due to COVID-19 [35]. Since the occurrence of the coronavirus pandemic, the market value for fresh fruit and vegetables has shown a slight decrease. In 2019, the market value for fresh fruit and vegetables amounted to USD 5.5798 million, whereas in 2021, it was only USD 5.2749 [36]. A decline was also seen in the US per capita consumption of apples, which reduced from 17.59 pounds per consumer in 2019 to 16.18 pounds per consumer in 2021 [37]. Studies on consumption patterns since the occurrence of COVID-19 are quite diverse; on the one hand, it is reported that households with a low income or those suffering from food insecurity decreased their consumption of fresh, as well as processed, fruit and vegetables due to unavailability, poor quality, high price, reduced store trips, and concerns regarding contamination [38]. On the other hand, studies also discuss health and wellness trends that have led to an increased consumption of fresh fruit and vegetables, accompanied by the limited options to eat away from home that were available at the start of the pandemic [38–40].

Further studies outline the distrust towards global supply chains and an increased tendency towards buying local, whilst others present the problems faced by local farmers, food retailers and restaurants at the beginning of the pandemic [41]. Aspects such as the loss of income, the opportunity cost of time, and supply chain disruptions have also impacted consumption patterns. These factors, alongside media coverage within both mainstream media and on social media platforms, also served to push trends such as buying local [41–44].

To add value to the extant body of literature within this topic area, this study aims to explore factors driving US consumer intentions to purchase apples locally, specifically using the Theory of Planned Behavior (TPB), which is a widely accepted conceptual framework suitable in a food context [45,46]. Examining consumer behavior through the lens of the TPB has enjoyed a long history of research. TPB is a particularly useful theory because it examines the multiple psychological paths that contribute to purchase decisions and behaviors [47]. These include whether consumers feel the purchase is the right thing to do, whether others will approve, and if there are significant impediments to purchasing and whether they can be overcome [48]. Prior to the COVID-19 pandemic, there was a steady stream of studies using the TPB to examine similar food decisions, such as the purchase of organic food, organic milk, fresh fruits and vegetables through the application of segmentation studies of local food consumers [48–53]. See Appendix A for a table detailing the pre-COVID research in this area and the subsequent operationalization of TPB constructs.

However, it is evident that, since COVID-19, consumers have been questioning their food purchasing decisions by evaluating the benefits and consequences of these decisions, and would have likely explored alternative suppliers to address scarcity or satisfy restrictions put in place due to COVID-19 [8,54,55]. As a result of the pandemic, the awareness of local food has increased and the modes of shopping and delivery have expanded; this also means that the impediments to such practices have also changed, so it is timely that a re-evaluation of the psychological drivers behind the purchase of local foods is undertaken [8,56].

The following section of this paper features a literature review and background regarding the conceptual framework used and introduces the hypotheses. Each hypothesis is backed up with supporting evidence for the proposed relationships. In the third section, the data collection and analysis, as well as the Partial Least Square Structural Equation Modelling (PLS-SEM) approach is outlined to the reader. The fourth section presents the results from the outer and inner model analysis, which are discussed in the fifth section. Finally, the conclusion section covers the theoretical and managerial limitations, acknowledging any limitation to the studies as well as suggesting ideas for future research.

2. Literature Review

2.1. The Theory of Planned Behavior as a Conceptual Framework

The Theory of Planned Behavior (TPB) was developed by the social psychologist Icek Ajzen and has been applied to a variety of different products and consumer decision-making situations [45]. The TPB postulates that the behavior of individuals (in this case, an apple consumer) is determined by their intentions to undertake this behavior, which in this instance is buying local apples [46]. Intentions build on attitudes, subjective norms, and perceived behavioral control [45]. Ajzen (1991) states that an attitude refers to a consumers' beliefs regarding their behavior; these beliefs can be either positive or negative in nature [46]. Three types of beliefs are distinguished, namely behavioral beliefs, normative beliefs and control beliefs [45–47]. Behavioral beliefs express themselves as attitudes related to the behavior of interest. This type of belief is determined by the perceived consequences of participating in the behavior, and an evaluation of the consequences of enacting on this behavior [47,57]. For instance, a consumer may believe that buying local food is good for them as it improves their health and wellbeing. However, they may also perceive buying local as more time consuming and/or more expensive compared to shopping elsewhere.

Similarly, normative beliefs manifest as a subjective norms, which relates to perceived social pressures stemming from an individual's social environment [47,57]. This includes colleagues, family and friends [56]. Normative beliefs are closely associated with ethical decision-making, and are a significant predictor for purchasing local or organic foods [48]. Emotions such as fear or guilt are associated with normative beliefs [58].

Lastly, control beliefs have become apparent as a form of perceived behavioral control; this term refers to the extent and level of control that an individual feels they have over their behavior [47]. If consumers believe they have only a few resources and opportunities available, they will perceive that they are not in control, which will subsequently make them adopt the behavior of interest [56]. For instance, consumers may believe that they have no time to go the farmers market, so they will not pursue this course of action.

Further attitudes are regarded as a requirement towards intentions and the consequent behavior as a result [46]. Ajzen (1991) also argues that if all influencing variables, namely attitudes, social norms and perceived behavioral control are strong, then the intention leading towards performing these behaviors will be equally as strong [46]. Recent research in the area of customer value co-creation behavior and neuromarketing provides an insight in subjective norms and behavioral intention. Family, friends and colleagues, advertisements on TV, as well as actors from social media are the most important influences when it comes to social norms and buying decisions [59]. This includes product choices, as well as the appropriateness of distribution channels, such as local retail outlets, online shops or sharing platforms [60–62]. In terms of perceived behavioral intention, the risk of infection, access to distribution channels and governmental restriction towards movement and gathering were seen as barriers towards consumer's intentions to buy local [41,42].

TPB constructs have proven to be strong predictors of various food choices applying and extending Ajzen's (1991) work. Various European and US studies used the TPB as a conceptual framework alongside partial least square structural equation modeling as their methodological approach [48–53]. It was found in these studies that attitudes, subjective norms, perceived behavioral control, self-identity, and past behaviors are direct predictors of intentions and behaviors related to buying or eating local food [48–53].

2.2. Conceptual Model and Hypothesis Development

The theoretical framework building on the TPB is presented in Figure 1. It is suggested that US consumers' intentions to purchase apples locally is influenced by behavioral, normative and control beliefs impacting their attitudes and subsequent behavior. Subjective norms and perceived behavioral control are shown as drivers towards behavioral intention. The following hypotheses are proposed:

US consumers appreciate products that are produced, processed, and marketed locally [13]. This is due to their beliefs that local production systems are less industrialized, more ethical and more sustainable [13,19,63,64]. Positive attitudes towards buying local food are associated with behavioral beliefs, which include the need to support the local producers and the local economy [49]. Other behavioral beliefs include a desire to become more familiar with horticultural production, or to increase one's knowledge regarding horticulture and varietals [21]. Purchasing local food is based on short supply chains that allow for direct interaction between the grower and the end consumer, which ensures complete transparency around the production processes involved [63].
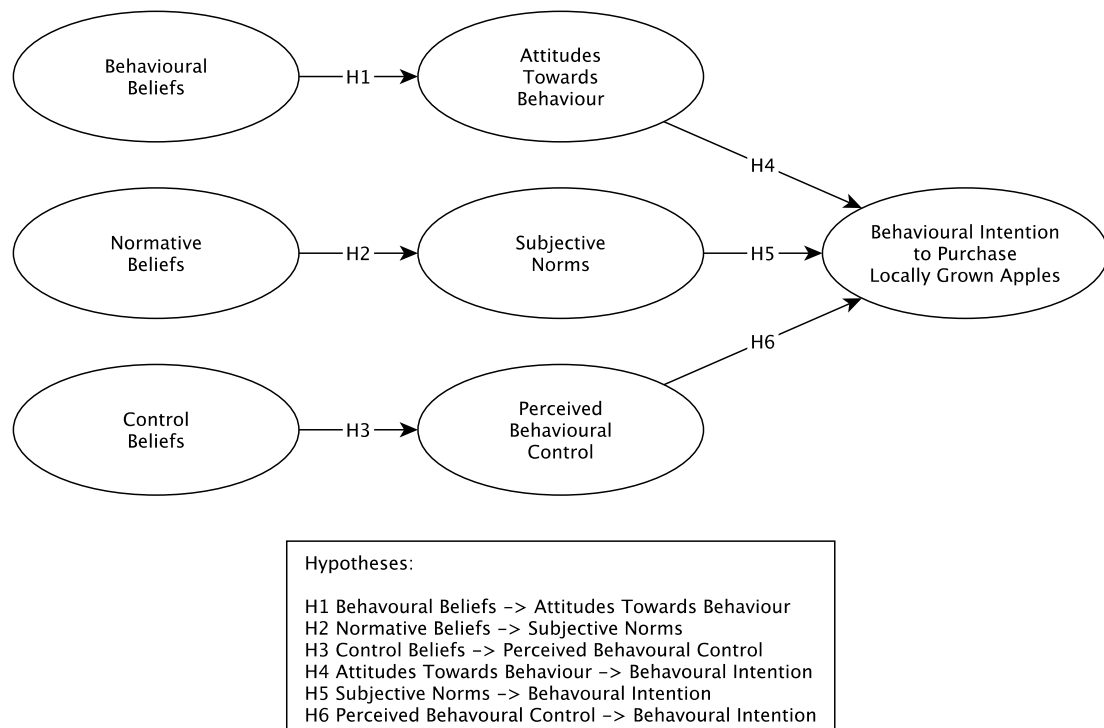
Figure 1. Conceptual Model and Proposed Hypotheses.

Hypothesis 1 (H1). *Behavioral beliefs will impact attitudes towards behavior.*

Normative beliefs are based on the fact that consumers and their attitudes are influenced by what other actors in their social network believe. Attitudes towards any behavior, including buying local, is subject to approval or disapproval by trusted actors such as family, colleagues and friends, as well as credible information sources such as governments and research institutions [48]. Mainstream media and influencers on social media also serve to shape normative beliefs and attitudes towards buying local [59]. Control beliefs explain the presence of factors that either support or inhibit behavioral intentions; in this case, buying local is the result of whether or not consumers believe that they will be able to buy or perform the desired behavior [47]. For this decision, both internal and external control factors are considered. While internal control factors refer to the control of the specific individual, external control factors relate to the individuals' immediate environment [47]. This includes family or work obligations, or unanticipated events such as the occurence of COVID-19 [42,47].

Hypothesis 2 (H2). *Normative beliefs will impact subjective norms.*

Hypothesis 3 (H3). *Control beliefs will impact perceived behavioral control.*

Consumer attitudes towards buying local are usually positive or negative. The recent body of literature in this area discusses that positive attitudes towards buying local stem from five key product-related aspects; the perceived health benefits of the product, the overall product quality, and the economic, environmental and social benefits associated with the purchase [65–69]. Consumers perceive local food as more desirable and valuable than other options as they are in favor of short transportation distances and supporting local producers [70–73].

Hypothesis 4 (H4). *Attitudes towards behavior will positively impact behavioral intentions to purchase apples locally.*

Subjective norms reflect the degree of perceived social pressures to buy local. Reference groups, including family, friends and colleagues impact behavioral intentions to buy local as these groups are built on social and cultural norms [48]. Despite these close social ties, advertising on both mainstream media and social media influences consumer intentions to buy local [42]. Studies show that subjective norms also play an important role in consumerism as they influence consumer purchase intentions and attitudes alike [47].

Hypothesis 5 (H5). *Subjective norms will impact behavioral intentions to purchase apples locally.*

Given that perceived behavioral control refers to an individual's perceived difficulty or ease when buying locally, factors influencing this perception need to be discussed. Perceived behavioral control is closely aligned with control beliefs [47], and includes obstacles such as unprecedented events within an individual's social networks or in their external environment [36]. Extant research in this area also shows that perceived behavioral control is not only a good predictor for behavioral intentions, but also for actual behaviors [74–77].

Hypothesis 6 (H6). *Perceived behavioral control will impact behavioral intentions to purchase apples locally.*

3. Material and Methods

3.1. Data Collection and Construct Measurement

An online survey was conducted from the 29 October to 1 November 2021 using the online survey tool Qualtrics and the crowd-sourcing platform Amazon Mechanical Turk (Mturk) [78,79]. The data for this investigation stem from an omnibus survey targeting various topics related to apple consumption. This included socio-demographic information, attitudes, beliefs and the intention to buy apples locally. A sample survey related to the present analysis is included in the supplemental materials. Respondents had to be over 21 years old to participate in the survey. Initially, 400 survey responses were collected. However, incomplete responses were eliminated, as these were subject to speeding (completion time significantly lower than the average response time of 25 min) and unsystematic response behavior [80,81]. After data cleaning, a total of 383 complete response where used for the analysis.

A sample size of 383 residents is still more than sufficient to determine the key factors driving US consumers' intentions to buy apples locally via partial least squares structural equation modelling (PLS-SEM) [82–84]. Following Hair et al. (2011), in PLS-SEM, the '10-times rule' is a widely used sample size estimation method stating that the sample size should be greater than 10 times the maximum number of inner or outer model links pointing at any latent variable in the conceptual model [85].

Ideally, the research would have used and validated pre-existing scales from the literature, for instance Kumar and Smith (2018), who researched factors driving and prohibiting consumer's intent to buy local food in US [48]. However, this research was conducted before the occurrence of COVID-19, so the applicability of their scales was considered somewhat limited. Given that COVID-19 brought hardships to communities all around the US, attitudinal statements were shaped towards the support of growers, local communities and economic issues [5,7,8], rather than dedicating them to environmental and health issues, which were well-explored in the past [48–53]. Thus, measurement items were developed following Ajzen (1991) [46,47]. In addition, studies related to horticultural business and buying local in the US were considered for this purpose [5,7,8]. Behavioral beliefs (4 items), normative beliefs (3 items) and control beliefs (5 items) were examined. This was then followed by attitudes towards behavior (3 items), subjective norms (3 items), perceived behavioral control (3 items) and behavioral intentions (3 items) were all measured using 7-point Likert scales. The scales measured quality, agreement, likeliness and correctness.

3.2. Data Analysis

The sample of US residents was analyzed using descriptive statistics, whilst PLS-SEM was employed to examine the factors that determined the intentions of US consumers

towards purchasing local apples. As a widely used analytical tool in the social sciences, PLS-SEM follows a sequential procedure that consists of a measurement model and a structural model (which is referred to as the outer then inner model) [85,86]. While the structural model displays the relationships between the proposed model constructs, the measurement model displays the relationship between constructs and indicators [84]. Contributions to the scale are shown when an indicator loading is greater than 0.4. Average variance extracted (AVE) confirms that a sufficient amount of variance between items is achieved when a score of greater than 0.5 is obtained [84]. The internal consistency reliability explains the extent to which the individual indicators explain the underlying constructs. The internal consistency reliability is measured using Cronbach's alpha and composite reliability [82,85–87]. In exploratory studies, values above 0.6 are considered appropriate for both criteria.

Discriminant validity describes how well one construct differs from another construct and that the proposed items are most aligned with the proposed scale [85]. This is determined using the Fornell–Larcker criterion and the examination of cross loadings [87]. The Fornell–Larcker criterion suggests that the square root of a scale's AVE should be greater than the cross loadings [85,88,89]. In order to ascertain whether multicollinearity in the data exists, the Variance Inflation Factor (VIF) is calculated; the target threshold is for the VIF needs to be less than 5 in order to ensure that there is no multicollinearity [85].

Once the validity and reliability of the measurement model are deemed appropriate, the inner model analysis is conducted. The inner model analysis is dedicated to the structural fit, the explanatory power, and the predictive relevance of the model [81]. Caution should be taken regarding the interpretability of model fit indices in SEM-PLS [84]. Higher scores are obtained when using measures of model fit such as goodness of fit (GoF), and normed fit index (NFI) are considered to be more accurate, whilst smaller scores obtained for the standardized root mean square residual (SRMR) indicate a better fit. Scores exceeding 0.10 are viewed as undesirable, while scores less than 0.08 are deemed to be acceptable. The model's R^2 indicates its ability to explain the variance of the dependent constructs, known as its explanatory power. R^2 values near 0.25 are viewed as weak, near 0.50 as moderate, and near or above 0.75 as substantial. The predictive validity uses the Stone–Geisser criterion, and is known as Q^2. Values larger than zero show acceptable predictive relevance, values near 0.25 are of medium relevance, and values near or above 0.50 possess strong predictive relevance [85].

4. Results

The profiles of the respondents and their socio-demographic information is shown in Table 1. The majority of the respondents resided in the Midwest (34.8%), followed by the South (23.5%), Northeast (21.7%) and West (20.1%) of the United States; 51% identified as men and 49% as women. The median respondent was aged between 25 and 34 years, had a bachelor's degree, and an annual pre-tax income of between USD 25k and USD 50k per year.

Item factor loadings are displayed in Table 2, with any loadings higher than 0.4 indicating that they provided enough of a contribution to their construct scale. Construct reliability and validity were satisfied with Cronbach's alpha and composite reliability scores both above 0.6, thereby verifying reliability; the AVE scores over 0.5 also confirmed convergent validity [85].

Table 1. Profile of respondents.

	Freq.	%	Median	Std. Dev
Age				
Under 21	2	0.5		
21–24	16	4.2		
25–34	215	56.1	✓	0.940
35–44	104	27.2		
45–54	27	7.0		
55–64	14	3.7		
65+	5	1.3		
Total	383	100		
Education				
Did not finish high school	6	1.6		
Finished high school	46	12.0		
Attended university	40	10.4		
Bachelor's degree	223	58.2	✓	0.927
Postgraduate degree	68	17.8		
Total	383	100		
Household Annual Income				
USD 0 to USD 24,999	80	20.9		
USD 25,000 to USD 49,999	117	30.5	✓	1.141
USD 50,000 to USD 74,999	119	31.1		
USD 75,000 to USD 99.999	40	10.4		
USD 100,000 or higher	27	7.0		
Total	383	100		
Gender				
Male	196	51.2		0.501
Female	187	48.8		
Total	383	100		
US Geographical Distribution				
Northeast	83	21.7		
Midwest	133	34.8		
South	90	23.5		
West	77	20.1		
Total	383	100		

Note: n = 383.

Table 2. Reliability and Validity Check.

Scales and Items	Factor Loadings [≥0.4]	Cronbach's Alpha [≥0.7]	Composite Reliability (≥0.7)	Average Variance Extracted [≥0.5]
Behavioral Beliefs (adapted from Ajzen, 1991)		0.770	0.852	0.592

Table 2. *Cont.*

Scales and Items	Factor Loadings [≥0.4]	Cronbach's Alpha [≥0.7]	Composite Reliability (≥0.7]	Average Variance Extracted [≥0.5]
Buying locally grown apples will help me to become more familiar with apple production.	0.826			
Buying locally grown apples will help me to make a positive contribution to the local economy.	0.663			
Buying locally grown apples will help me to interact regular with local growers.	0.757			
Buying locally grown apples will help me to learn about fruit quality.	0.820			
Attitudes Towards Behavior (adapted from Ajzen, 1991)		0.734	0.849	0.652
For me buying locally grown apples on a regular basis is easy.	0.771			
For me buying locally grown apples on a regular basis is good.	0.804			
For me buying locally grown apples on a regular basis is valuable.	0.846			
Normative Beliefs (adapted from Ajzen, 1991)		0.891	0.932	0.819
My family thinks I should buy locally grown apples on a regular basis.	0.901			
My friends think I should buy locally grown apples on a regular basis.	0.905			
My colleagues think I should buy locally grown apples on a regular basis.	0.910			
Subjective Norms (adapted from Ajzen, 1991)		0.729	0.846	0.650
Most people that are important to me think I should buy locally grown apples on a regular basis.	0.860			
It is expected of me that I buy locally grown apples on a regular basis.	0.859			
Most people I value would approve of me buying locally grown apples on a regular basis.	0.687			

Table 2. *Cont.*

Scales and Items	Factor Loadings [≥0.4]	Cronbach's Alpha [≥0.7]	Composite Reliability (≥0.7)	Average Variance Extracted [≥0.5]
Control Beliefs (adapted from Ajzen, 1991)		0.904	0.928	0.722
Likelihood*Strength that unanticipated events will impede buying locally grown apples.	0.885			
Likelihood*Strength that family obligations will impede buying locally grown apples.	0.821			
Likelihood*Strength that work obligations will impede buying locally grown apples.	0.873			
Likelihood*Strength that other shopping activities will impede buying locally grown apples.	0.878			
Likelihood*Strength that shortages in supply will impede buying locally grown apples.	0.786			
Perceived Behavioral Control (adapted from Ajzen, 1991)		0.715	0.837	0.632
Whether or not I buy locally grown apples on a regular basis is completely up to me.	0.701			
Most of my friends buy locally grown apples on a regular basis.	0.841			
I am confident if I would want to buy locally grown apples on a regular basis I could.	0.836			
Behavioral Intention (adapted from Ajzen, 1991)		0.865	0.917	0.788
I plan to buy locally grown apples on a regular basis.	0.863			
I will make an effort to buy locally grown apples on a regular basis.	0.880			
I intend to buy locally grown apples on a regular basis.	0.919			

Note: Target values in column heading [in brackets]. Acceptable values for factor loadings are 0.4 and above; Cronbach's alpha and composite reliability: 0.7 and above; average variance extracted: 0.5 and above [85] (pp. 117–120).

Table 3 is dedicated to discriminant validity and indicates that it is partially confirmed. The cross loadings of all but one ratio were lower than the square root of each constructs' Two quality measures namely the Fornell–Larcker criterion and the cross loadings were used to examine the discriminant validity. AVE values of the constructs must be greater than all squared correlations of their respective variables with the other constructs to satisfy the Fornell–Larcker criterion. Additionally, the largest VIF was 3.416 and the average VIF was 2.084, indicating that collinearity did not affect the model [84].

Table 3. Discriminant Validity.

Fornell–Larcker Criterion	Attitudes towards Behavior	Behavioral Beliefs	Behavioral Intention	Control Beliefs	Normative Beliefs	Perceived Behavioral Control	Subjective Norms
Attitudes_Towards_Behavior	0.807						
Behavioral Beliefs	0.691	0.769					
Behavioral Intention	0.776	0.625	0.887				
Control Beliefs	0.464	0.411	0.448	0.850			
Normative Beliefs	0.241	0.174	0.223	0.310	0.905		
Perceived_Behavioral_Control	0.762	0.568	0.712	0.478	0.327	0.795	
Subjective Norms	0.755	0.606	0.774	0.498	0.275	0.809 *	0.806

Note: * Above the recommended maximum threshold.

The model can be deemed to be an adequate fit due to having a GoF of 0.500, an NFI of 0.744, and an acceptable SRMR of 0.072. The average R^2 values were 0.367, indicating that the model has an acceptable but weak-to-moderate explanatory power, and average Q^2 values were 0.362, indicating moderate-to-strong predictive relevance. Given that there was adequate model fit, and a weak-to-moderate explanatory power medium for a strong predictive relevance, the structure of the model was confirmed to be acceptable for hypothesis testing, with the results shown in Table 4 and Figure 2. As anticipated, behavioral beliefs significantly impact attitudes towards behavior, normative beliefs significantly impact subjective norms, and control beliefs impact perceived behavioral control, supporting H1, H2 and H3. Additionally, H4 and H5 found support because attitudes towards behavior and subjective norms significantly impact US consumers' intention to purchase apples locally. Perceived behavioral control was not found to be a significant factor; therefore, H6 is not supported.
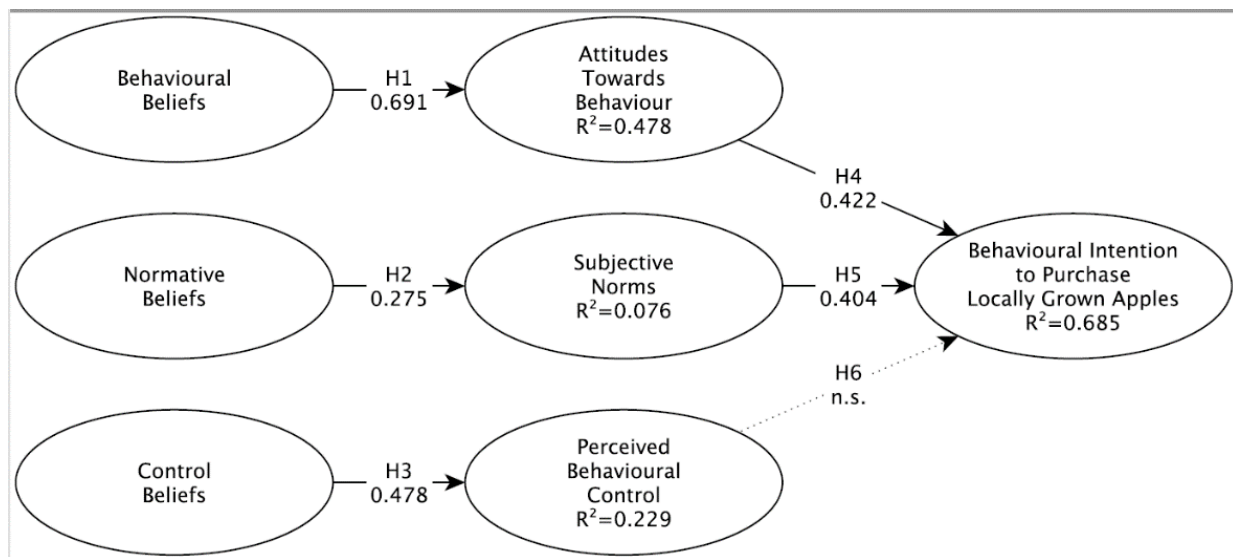

Figure 2. Conceptual Model Results.

Table 4. Results from Hypothesis Testing.

Hypothesized Relationship	Coefficient	T Stat	*p*-Value	Supported/ Not Supported
H1: Behavioral Beliefs -> Attitudes Towards Behavior	0.691	22.486	0.000	Supported
H2: Normative Beliefs -> Subjective Norms	0.275	4.728	0.000	Supported
H3: Control Beliefs -> Perceived Behavioral Control	0.478	10.443	0.000	Supported
H4: Attitudes Towards Behavior -> Behavioral Intention	0.422	7.843	0.000	Supported
H5: Subjective Norms -> Behavioral Intention	0.404	7.078	0.000	Supported
H6: Perceived Behavioral Control -> Behavioral Intention	0.063	1.052	0.293	Not Supported

Bold indicates that $p < 0.01$.

5. Discussion

This study aimed to understand the factors explaining US consumers' intentions towards the purchase of locally grown apples. The Theory of Planned Behavior was used as a conceptual framework to shape the proposed model. Overall, the model was found to have an adequate fit and explanatory power. The results emphasize the importance of behavioral, normative and control beliefs as important factors when considering attitudes. Subjective norms and perceived behavioral control are also key drivers in understanding behavioral intention. Overall, the findings of this research were consistent with those of Kumar and Smith (2018) [48], which was a pre-COVID-19 TPB local food investigation that used a similar research methodology. In both studies, attitudes towards local food behavior were found to be the strongest predictor of purchase intentions, followed by subjective norms, and in both studies, perceived behavioral control was not significant. In the pre-COVID-19 study, the coefficient value for attitudes towards behavior was over double the value of subjective norms (0.680 vs. 0.307), but in the current study, attitudes towards behavior are only slightly larger than subjective norms (0.422 vs. 0.404). The pre-COVID-19 TPB study of local food by Shin, Hancer, and Song (2016) [51] used some constructs and a methodology that is somewhat similar to this current study. These authors found that attitudes and perceived behavioral control influenced a longer-term behavioral intention (within 1 year) but subjective norms did not [51]. While these comparisons are only anecdotal, they provide some evidence that the relative influence of these drivers may have shifted, and that the opinions of others may be play a more influential role in terms of purchase intentions towards local food since the COVID-19 pandemic.

Perceived behavioral control describes the perception of the difficulty of enacting a behavior [48]. The insignificance of the relationship between perceived behavioral control and the intention to purchase locally grown apples could be explained by US consumers believing they can purchase locally grown apples, as doing so is still in their control. However, behavioral control is not always ultimately translated into intention [48]. Several reasons why behavioral control may not have been translated into intention could be offered by this finding; this could be attributed to the level of uncertainty, the level of risk exposure and the frequent changes associated with the COVID-19 pandemic. Other reasons could be associated with the product itself, such as apple prices, the overall product quality and incentives to buy the product [48]. Given that these reasons are not immediately apparent, this study confirms Kumar and Smith's (2018) call for further investigation regarding the barriers that prevent US consumers from purchasing locally grown apples [48].

Attitudes towards behavior as well as subjective norms are not only crucial to Ajzen's (1991) TPB discourse, but are of relevance to horticultural growers and food marketers.

Attitudes allow these stakeholders to get a glimpse into the consumers' mind [49]. Insights into consumer attitudes towards apple preferences and purchase behavior are crucial as consumer preferences have changed due to COVID-19, and as a result, the horticultural distribution grids and supply chains are out of balance [4,8]. Being exposed to situations of over-supply or stock outs may lead consumers towards local purchases, as local food networks generate security and trust through the ability to know and interact with the grower.

Relationship marketing focuses on customer loyalty and long-term engagement [90], and thus can be applied as a useful strategy for apple growers selling local apples directly to the consumer. Relationship marketing focuses on creating strong consumer bonds towards the product concerned [90]. During the COVID-19 pandemic, it has been seen that consumers who intend to buy local are often interested in supporting their local economy, and want to keep in touch with the local businesses that they support [91]. These consumers aim to purchase not only quality products, but also like to build rapport with those who work at the local businesses that they frequent. Digital technologies such as apps, chat bots, and platforms such as Zoom are all examples of means of communication that are useful to accommodate the needs of these consumers [91]. In addition to this, using social media to showcase videos that help to create a digital rapport between the growers and their end consumers may help to support the bonds required for successful relationship marketing. The use of digital media platforms as a promotion tool allows growers to showcase the uniqueness of local products. They can also provide evidence showing how the money spent on locally grown apples makes an impact on both the business itself and the local community within which it operates [91]. Such an endeavor may be accompanied with a call for action [90], whereby consumers are invited to like or share pictures of the fruit that they have purchased via social media.

Growers and food marketers may want to capitalize on the concept of subjective norms through online marketing and sales [5,90]. Within the context of buying apples locally, using social media and webpages may be a good strategy. Behavioral targeting and contextual targeting will allow for the placement of advertisements and information that reassure consumers that buying local is a desirable choice that is approved by society. References to governmental campaigns [13] or horticultural industry bodies may be helpful to establish trust, while influencers are useful for reaching a wider audience.

6. Conclusions

6.1. Managerial Contributions and Theoretical Implications

This study used the TPB and identified key factors driving US consumer intentions to buy apples locally. The results highlight behavioral, normative and control beliefs as important for attitudes, subjective norms, and perceived behavioral control. While subjective norms and attitudes were found to be significant predictors of behavioral intentions, perceived behavioral control was found to be non-significant.

The knowledge that these key factors are relevant is very valuable for horticultural growers and marketing managers in both the US apple industry and food retail. Normative and behavioral beliefs are useful for marketers as they provide insights into consumer associations with the product and may show the variety of approaches that actors and entities go through in order to develop their acceptance of local apples. Behavioral beliefs are equally as important because they indicate beliefs about the presence of factors that may facilitate or hinder the consumers' intentions and their ability to buy apples locally. Since the everyday life of consumers is still being impacted by the disruption of COVID-19, it is crucial to understand these barriers to acceptance. Nevertheless, everyday consumers alongside committed locavores wish to support their local economy and develop a rapport with growers in order to gain information about food production and quality. Local growers and organizers of farmers markets should also make efforts towards creating a situation where financial transactions can be made easily, and invest time and effort into relationship building with both new and existing customers.

Aside from the practical value of the study, the conceptual framework of the model presented in this study, alongside a small number of studies on apple purchases during the COVID-19 pandemic, addresses a timely issue. Due to the unprecedented nature of the COVID-19 situation, we believe that this research adds value to the existing body of literature.

6.2. Limitation and Future Research Perspectives

As sampling strategies clearly impact the precision of estimates and the power of a study to draw conclusions, samples obtained from crowdsourcing platforms such as Mturk deserve some critical reflection. While researchers in the social sciences use Mturk due to its advantages of reduced cost and speed, when it comes to data collection, the samples should be considered a purposive but convenient sample instead of a representative national sample. However, compared with other forms of convenience sampling, they are found to be of equal quality [79].

As seen from the findings of this study and from pre-COVID-19 studies, predictors for consumer preferences towards locally grown apples and other food items are quite diverse. While it appears that the predictors themselves have not changed overall, the focus of the discussion which gives importance to these predictors has changed. This is due to the alterations and disruptions of everyday life, including food shopping, occurring as a result of the COVID-19 pandemic. The details and significance of these changes can be explored in future research. The execution of this would require the availability of pre-COVID-19 and current COVID-19 data. The absence of pre-COVID-19 data is acknowledged as a limitation of this study.

A further drawback that can be attributed to this sampling approach is that an important consumer group (those aged 65 years and older) did not have a strong presence in the data collected. The existing body of literature shows positive and negative attitudes towards buying local within this age group. Positive and negative attitudes are rooted in beliefs about food quality and production, pricing, and the mobility of the individual consumers. To overcome this drawback, future investigations using crowd-sourcing platforms or opt-panel providers could set specific quotas for age and other socio-demographic factors relevant to the study. Due the ongoing coronavirus pandemic, the authors of this paper are hesitant to recommend surveying people at the point of sale, in areas such as farmers' markets, farm gates or similar places, even though this would ease the access to this under-represented consumer group.

Studying the perspectives of elderly consumers would be valuable with respect to future studies. Such a study could be framed in a context of willingness to pay for heirloom apples, as it is expected that these consumers have a higher interest and more knowledge when comes to rare and old varieties. One possible approach to examine the influence of age would be to test its mediation effect on the model. For example, age and other mediation effects, such as behavioral intention, could identify whether model relationships vary across the range of someone's age or strength of behavioral intention.

Future research could include the role of emotion within the TPB framework. The TPB has been widely extended and is often criticized for not directly acknowledging the role of emotion when buying sustainable or local food. Emotions are said to more accurately predict direct and indirect influences on pro-social consumer behavior [48]. Alternatively, studies could focus on consumer ethnocentrism and investigate the understanding of buying local among rural, urban and cosmopolitan consumers, as well as their preferred ways of buying local. Given that cosmopolitan consumers are frequently exposed to food cultures other than their own, it would be interesting to explore their understanding of the concept of what is considered to be local and whether these consumers have an actual intention to purchase apples locally. Research into the influence of subjective norms should also be examined in future studies. The understanding of what is considered as local is strongly influenced by social circles. For example, in the US, both food and subjective

norms play important roles in the context of cultural diversity and ethnic identity and can be used as pathways towards understanding local culture and the inclusion of immigrants.

Lastly, the concept of what is considered to be local is worth studying in relation to food assistance or online farmers' markets. In an online farmer's market context, the concept of adding value, which allows researchers to investigate to differences regarding how produce is grown and marketed, could be explored. This could potentially be carried out by examining current labor practices, or by investigating the impact of COVID-19 on businesses and the wider community, or through sharing a commitment to local places and health and safety via online market spaces.

Appendix A

Table A1. Predictors of Preference to Buy Local in Pre-COVIDian Times.

Study	Beliefs (Behavioral, Normative, Control)	Attitude towards Behavior	Subjective Norm	Perceived Behavioral Control	Intention
Kumar, A.; Smith, S. Understanding local food consumers: Theory of planned behavior and segmentation approach. *J. Food Prod. Mark.* 2018, 24, 196–215 [48].	Health Concern Environmental Concern Concern for the local economy	Attitude towards local food	People that are important to me People that I value	Buying local food is easy. If I wanted to, it would be possible to buy local food	Intention to purchase local food
Tomić, M.; Matulić, D.; Jelić, M. What determines fresh fish consumption in Croatia? *Appetite* 2016, *106*, 13–22 [49].	N/A	Liking Health Feeling good Good taste	Friends Family	Difficult to judge the quality and freshness of fish The chance to make a bad choice is big. I never know whether I make a good choice	Intent within 2 weeks
Carfora, V.; Caso, D.; Conner, M. The role of self-identity in predicting fruit and vegetable intake. *Appetite* 2016, 106, 23–29 [50].	N/A	Consumption of at least five portion of fruit and vegetable per day in the next month	People who are important to me	Whether or not I eat at least five portions of fruit and vegetables per day over the next month is entirely up to me	Intention to eat 5 portion of fruit and vegetable per day
Shin, Y.H.; Hancer, M.; Song, J.H. Self-congruity and the theory of planned behavior in the prediction of local food purchase. *J. Int. Food Agribus. Mark.* 2016, 28, 330–345 [51].	N/A	Instrumental (useful–worthless) Experiential (pleasant–unpleasant) Evaluative (good–bad)	Most people who are important to me think that I should purchase local food	I am confident that I could purchase local food if I want to For me, purchasing local food is easy	I expect to purchase local food within 1 year.

Table A1. *Cont.*

Study	Beliefs (Behavioral, Normative, Control)	Attitude towards Behavior	Subjective Norm	Perceived Behavioral Control	Intention
Arvola, A.; Vassallo, M.; Dean, M.; Lampila, P.; Saba, A.; Lähteenmäki, L.; Shepherd, R. Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behavior. *Appetite* 2008, 50, 443–454 [52].	Buying organic apples instead of conventional apples would mean: more expensive, free from chemicals, healthier, better tasting, better looking, produced in a way that is better for the environment, more natural, trust how the apples have been produced	Buying organic apples instead of conventional apples would feel like making a personal contribution to something better and feel like the morally right thing to do to make me feel like a better person	People that are important to me. People that I value	Buying organic apples instead of conventional apples is easy–difficult if I wanted to possible for me to buy organic apples instead of conventional apples	Intention to purchase organic apples
Carfora, V.; Cavallo, C.; Caso, D.; Del Giudice, T.; De Devitiis, B.; Viscecchia, R.; Cicia, G. Explaining consumer purchase behavior for organic milk: Including trust and green self-identity within the theory of planned behavior. *Food Qual. Prefer.* 2019, 76, 1–9 [53].	N/A	The purchase of organic milk in the next month is bad–good The purchase of organic milk in the next month is harmful –beneficial The purchase of organic milk in the next month is unpleasant–pleasant The purchase of organic milk in the next month is unenjoyable–enjoyable The purchase of organic milk in the next month is foolish–wise	People who are important to me I feel under social pressure	Whether or not I purchase organic milk over the next month is entirely up to me How much personal control do you feel you have over organic milk purchase in the next month? To what extent do you feel that whether you purchase organic milk in the next month is beyond your control? I believe I have the ability to purchase organic milk in the next month To what extent do you see yourself as being capable of purchasing organic milk in the next month?	I intend to purchase organic milk over the next month I plan to purchase organic milk over the next month I want to purchase organic milk over the next month

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