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Edible landscape: Key factors determining consumers' commitment and willingness to accept opportunity cost and risk of foraged food

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Introduction: This study is dedicated to urban foraging and explores key factors that determine consumer willingness to try foraged food, willingness to spend time and effort, accept risk as well as make a commitment towards food foraging.

Methods: A conceptual model is presented where general perceptions of nature, food foraging, and Covid-19 influence 3 specific attitudes about food foraging which drive 4 behavioural intentions towards food foraging. The model was tested using partial least square structural equation modelling.

Results: Results emphasize that the strongest driver of willingness to try are the approval of responsible food foraging activities and the individual benefits of food foraging. For the willingness to spend extra time and effort, all the predictors have some impact. In terms of willingness to accept risk, approval of responsible food foraging activities and the societal benefits of food foraging are influential. For commitment to food foraging, the individual and societal benefits are the most important key drivers.

Discussion: These findings are of relevance to marketing managers in the food industry and gastronomy, as well as municipalities, landscape designers, and horticultural businesses.

KEYWORDS

COVID-19, consumer, food, urban foraging, PLS-SEM

1 Introduction

The rapid spread of Covid-19 at the beginning of 2020 has led to a global pandemic resulting in disorder across horticultural systems in the US and worldwide (Hobbs, 2020). The disruptions in supply chain grids, as well as food price inflation, resulted in uncertainties for consumers and fueled their distrust of global food systems (Thilmany et al., 2021).

Consumer trends such as buying local, self-sufficiency, home, and community gardening, and food foraging, have increased in popularity as a direct consequence of these events (Bulgari et al., 2021; Chenarides et al., 2021; Clouse, 2022).

Food foraging refers to the activity of collecting edible plants or other food resources in forests, gardens, parks, abandoned properties, or other suitable locations (Synk et al., 2017; Fischer and Kowarik, 2020; Schunko et al., 2021; Hurley et al., 2022). The rise of urban horticulture over the past decade has contributed to food foraging activities, as many urban greenspaces have been transformed into places that can successfully provide services and products, for recreation, well-being, and food to citizens (Landor-Yamagata et al., 2018) Food foraging can include a wide range of plants, mushrooms, herbs, fruits, seeds, nuts, and roots (Brandner and Schunko, 2022; Marquina et al., 2022) and allows consumers to not only connect with their local landscapes but increase their food security, plant knowledge, and community activities (Bunge et al., 2019). Other reasons and motivations to forage for food are curiosity and fun, a means to improve health and well-being, and an interest in training, teaching, and do-it-yourself (Landor-Yamagata et al., 2018).

Food foraging may be conducted individually, but also can occur as a group activity. Such groups can increase legitimacy by operating within legal boundaries and accepted social norms (Schunko and Brandner, 2022). While in some communities, food foraging is associated with poverty, urban-dwelling, and stigma (Gaither et al., 2020; Garekae and Shackleton, 2020) or frowned upon by authorities (Schunko and Brandner, 2022), in other communities it is widely accepted and promoted through web pages, apps, and maps showing publicly available edible landscapes (Landor-Yamagata et al., 2018). McLain et al. (2014) discuss it as a part of popular culture, with books, articles, and even elite restaurants showcasing foraged food. Food foraging is associated with culture and traditions, as well as with ideologies in alternative food movements (Galt et al., 2014; Schunko et al., 2015; Nyman, 2019; Sardeshpande & Shackleton, 2020).

Food foraging has been well-explored, before and since the occurrence of Covid-19 (Clouse, 2022). Studies have been examined from several perspectives, including anthropological, sociological, ecological, and forestry (Poe et al., 2013; Lewis et al., 2015; Barnard, 2016; Svizzero, 2016; Hurley and Emery, 2018; Schunko et al., 2021; Veen et al., 2021), but studies on food foraging as a form of consumer behavior are not as widely available.

Glover et al. (2014) investigated consumer willingness to pay for *Diospyros Texana* (Texas Persimmon) as a food source. Texas Persimmon is a native species that exists in the regions of San Marcos, Austin, New Braunfels, Wimberley, and Bastrop, but is not yet commercialized. It is a fruit that is obtained through food foraging. Glover et al. (2014) conducted a mixed-method study surveying 400 farmers market visitors and interviewing 17 restaurant owners. Restaurant owners appreciated Texas Persimmon and reported their willingness to pay between $3.59 and $3.69/lb. Results show that consumers buying local food in the age group of 25–34 years who value and are concerned about sustainability are the major target groups for Texas Persimmon. Farmers market visitors were willing to pay prices like those found in specialty stores.

The present study extends the work of Glover et al. (2014). In the context of consumer behavior, the present paper aims to explore key factors driving or inhibiting willingness to try foraged food, willingness to accept opportunity cost and risk, and commitment toward food foraging. This study seeks to fill this literature gap by exploring key factors thought to impact US consumer preferences related to food foraging.

2 Key factors explaining food foraging behavior

Food foraging can be seen as behavior involving the identification, harvest, collection, and ultimately consumption of edible plants found in rural and urban landscapes. Therefore, food foraging is more time-consuming and requires more effort than regular food shopping, and comes with risk and opportunity costs. In terms of risk, there are issues of legality, social approval, and incorrect plant identification causing harm to nature. Besides these issues, consumers may still be willing to try foraged food or be committed to the behavior, as the behavior is associated with societal and individual benefits.

2.1 Nature identity

Previous studies on gardening and obtaining food from nature such as hunting, fishing, and food foraging emphasize that people who choose these forms of acquiring food usually have positive attitudes toward being outdoors, enjoy being active, or consider nature as an important part of their identity (Byrd and Widmar, 2015; Byrd et al., 2017; Palliwoda et al., 2017; Fischer et al., 2019; Schunko et al., 2021). This part of identity is reportedly shaped by childhood experiences, family traditions, or personal belief systems (Chipeniuk, 1995; McLain et al., 2014; Poe et al., 2014; Landor-Yamagata et al., 2018) Other reasons include an attentiveness toward consumption choices and their impact on nature and an interest in observing or studying flora and fauna (Schunko and Brandner, 2022). Previous studies usually identify two components of nature identity: nature contact and nature relatedness (Fischer and Kowarik, 2020; Garekae and Shackleton, 2020; Schunko and Brandner, 2022).

Of the two nature identity components, nature-relatedness has stronger involvement and is a stronger key factor in predicting foraging behavior, as it involves emotional, spiritual, and knowledge-based connectedness with nature (Nisbet and Zelenski, 2013, Schunko and Brandner, 2022). In addition, it has been found that nature-relatedness enhances human health and well-being (Schunko and Brandner, 2022). The well-being aspect can be explained through sensory experiences such as observing, touching, and smelling which are crucial aspects in urban foraging that allow the identification of plants, but they are also recreational and relaxing (Poe et al., 2014; Wilbur and Gibbs, 2020; Schunko and Brandner, 2022). Amidst this background and the fact that a relationship between identity and perception and ultimately attitudes exists, the following hypotheses are proposed:

Hypotheses 1 (H1): Nature identity positively impacts the consumers' perception of a) the societal benefits of food foraging, b) the individual benefits of food foraging, and c) the approval of responsible food foraging activities.

2.2 Local acceptance of food foraging

In addition to the nature identity aspect, previous studies also present aspects of social approval of food foraging as a behavior, or of food foragers in their community. It has been reported that responsible collection behavior is a major contributor to acceptance (Shackleton et al., 2017). This includes careful foraging behavior, respecting conservation areas and other areas where foraging is forbidden, and being mindful not to harvest and collect species that are protected (Schunko et al., 2021). Depending on the country or city, laws and regulations determine what constitutes responsible, legal, and socially approved foraging behavior (Linnekin, 2017; De Jong and Varley, 2018). This often includes conservation acts and greenspace regulations (Schunko et al., 2021). The recent body of literature describes accepted practices that are considerate and protective towards flora and fauna in foraging areas and considerate towards other foragers and the local community (Landor-Yamagata et al., 2018; Fischer and Kowarik, 2020; Sardeshpande and Shackleton, 2020). For instance, it is expected the foragers do not harvest everything and only take as much as they need (Poe et al., 2014). This is on the one hand a matter of distributive justice towards other foragers and on the other allowing nature to regenerate (Schunko et al., 2021). Respectively, over-foraging or having too many food foragers in one spot are unacceptable behaviors. Further, it is expected that the destruction of plant parts and landscapes is avoided (McLain et al., 2014; Grivins, 2021; Brandner and Schunko, 2022). This rule goes beyond conservation areas and protected species (Landor-Yamagata et al., 2018; Brandner and Schunko, 2022) Good foraging practices require the forager to not leave a trace. Since social approval is a widely accepted predictor that shapes perception and attitudes, the following hypotheses are proposed:

Hypothesis 2 (H2): Local acceptance of food foraging positively impacts the consumers' perception of a) the societal benefits of food foraging, b) the individual benefits of food foraging, and c) the approval of responsible food foraging activities.

2.3 Impact of Covid-19

The impact of Covid-19 in a food-foraging context has not been as widely studied, however, since 2020 the body of literature on food-foraging and foraging-related activities are steadily increasing (Clouse, 2022). It is known that consumers are seeking alternative ways of food shopping and that there are trends toward home-growing, self-sufficiency, and food foraging (Bulgari et al., 2021; Chenarides et al., 2021; Rombach et al., 2022). Horticultural and food studies have provided evidence that Covid-19 has caused consumers to worry about food prices, with one of the impacts, 2 years into the Covid-19 pandemic, is a recession and food price inflation in the US (Cleary and Chenarides, 2022; Lusk and McFadden, 2021). Covid-19 has impacted food purchases and has led consumers to switch distribution channels or means to obtain food. This is largely a result of demand and supply shocks (Hobbs, 2020; Bulgari et al., 2021; Lusk and McFadden, 2021) like increased demand for groceries and decreased demand for food away from home. Other examples of supply shocks were visible in the food service sector and in production and processing. Regulations affected the supply of food service options and caused a temporary slowdown in production and processing due to labor issues such as worker illnesses (Hobbs, 2020; Lusk and McFadden, 2021). A resultant tendency for self-sufficiency can be seen in increased interest in seeds and other horticultural supplies needed for food production, horticultural YouTube videos, and horticultural influences (Bulgari et al., 2021). Consumer studies report positive trends in homegrown fruit and vegetable production, beer, spirit, and winemaking, bee and livestock keeping, baking, and food processing (Rombach et al., 2022; Alton and Ratnieks, 2022; Behe et al., 2022; Gerdes et al., 2022). Given that Covid-19 facilitated a major paradigm shift across many areas of everyday life, including consumer attitudes, perceptions, and behavior, the following hypotheses are proposed:

Hypothesis 3 (H3): Covid-19 positively impacts the consumers' perception of a) the societal benefits of food foraging, b) the individual benefits of food foraging, and c) approval of responsible food foraging activities.

2.4 Societal and individual benefits of food foraging

There are individual and societal benefits associated with food foraging. The personal benefits of the activity include the ability to obtain resources for self-provision, an opportunity to sell foraged food as a supplemental income, to participate in ceremonial or spiritual observations, and to improve health and well-being (Shackleton et al., 2017). Other major personal benefits associated with food foraging are access to free food used as main meals, snacks, spices, and medicine. (Hurley and Emery, 2018). It has been reported that food foraging allows access to and dietary diversity of nutritious food across all strata, but is particularly important for low-income households, especially in terms of food security (Bunge et al., 2019; Dhyani and Kadaverugu, 2020). Shackleton et al. (2017) stress that beyond the range of material goods, there are intangible benefits, such as the understanding of goods and services provided by urban plants, animals, soils, and waters, that serve individuals and society alike. These include the sharing of environmental knowledge, practicing stewardship of the earth, and building and strengthening community, culture, and identity. Food foraging leverages the functional value of landscapes while protecting the aesthetic values demanded by other citizens and authorities in municipalities (Shackleton et al., 2017). Based on the assumption that the benefits associated with a behavior, in this case, food foraging leads to a positive impact on the acceptance and the execution of the behavior, it is hypothesized that:

Hypothesis 4 (H4): Societal benefits of food foraging positively impact a) willingness to try foraged food, b) willingness to accept opportunity cost to obtain foraged food, c) willingness to accept risk to obtain foraged food, and d) commitment to food foraging.

Hypothesis 5 (H5): Individual benefits of food foraging positively impact a) willingness to try foraged food, b) willingness to accept opportunity cost to obtain foraged food, c) willingness to accept risk to obtain foraged food, and d) commitment to food foraging.

2.5 Responsible food foraging behavior

Various studies outline the importance of responsible and socially acceptable food-foraging behavior (Poe et al., 2014; McLain et al., 2017; Charnley et al., 2018; Fischer and Kowarik, 2020; Sardeshpande and

Shackleton, 2020; Schunko et al., 2021) and have systemized the body of literature for this aspect of food foraging and united local ecological knowledge, mindset and beliefs of food foragers, their foraging practices and ecological impacts on individual population levels and entire ecosystems. Schunko et al. (2021) have presented foraging practices that prevent or limit negative ecological impacts as well as foraging practices that contribute to negative ecological impacts. They comment on the selection of species and location and emphasize that foraging rare plant species, protected plant species, and plant parts susceptible to harvesting pressure is irresponsible foraging behavior (Schunko et al., 2021). Instead, they recommend foraging species that are commonly and widely available, foraging at multiple locations, identifying species correctly before foraging, not leaving traces or damage, respecting areas where foraging is forbidden, and overall, acting carefully when collecting edible plants. This includes the use of appropriate foraging tools, careful shaking and pulling of branches, and foraging only ripe fruit or nuts (Schunko et al., 2021). In terms of when to forage, Schunko et al. (2021) focus on practices that should be avoided. Examples include foraging roots when the soil is wet, foraging leaves and flowers when they are wet, foraging plants earlier than necessary, foraging unripe fruit, or foraging that conflicts with the maintenance activities of city gardeners. Based on the assumption that responsible practices associated with a behavior, in this case, food foraging, lead to a positive impact on the acceptance and the execution of the behavior it is hypothesized that:

Hypothesis 6 (H6): Approval of responsible food foraging behavior positively impacts a) willingness to try foraged food, b) willingness to accept opportunity cost to obtain foraged food, c) willingness to accept risk to obtain foraged food, and d) commitment to food foraging.

Figure 1 is a graphical representation of the conceptual model integrating the proposed hypotheses that are built upon the extant literature previously discussed.

3 Material and methods

The present study is based on an online survey dedicated to food foraging. The survey covered topics such as socio-demographic information, attitudes, perceptions, and foraging behavior. The data for this study were collected in the summer of 2022 using Amazon Mechanical Turk (MTurk). MTurk is a well-established crowd-sourcing platform that has been been used for data collection purposes for the last decade in various disciplines within the social sciences (Wright and Goodman, 2019). Respondents needed to reside in the US and be at least 18 years old to participate. Further screening questions were asked about their interest and experience with food foraging. Respondents that indicated having neither experience nor interest were excluded from the study.

The survey data collection resulted in 417 responses, however, after data cleaning, a total of 401 responses were used for the analysis *via* Partial Least Square Structural Equation Modeling (PLS-SEM). The determination of the sample size followed the ten times rule, which is a commonly used rule in PLS-SEM studies (Hair et al., 2019). Questions related to food foraging perception, attitudes, and foraging practices were adapted from Schunko and Brandner (2022) and Sardeshpande and Shackleton (2020). The questions regarding the impact of Covid-19 and questions concerning foraging behavior (willingness to try, willingness to accept, and commitment) were developed by the authors, and those related to food prices and Covid-19 were adapted from Lusk and McFadden (2021). All questions were asked on a seven-point Likert scale, indicating agreement, approval, or concern.

With the help of statistical software packages such as SPSS and SmartPLS, the analysis was executed. While SPSS was used to generate descriptive statistics and explain the background of the survey participants, SmartPLS was used for the PLS-SEM *via* the assessment of the measurement models (outer model assessment) and the assessment of the structural model (inner model assessment). Following Hair et al. (2011) and Hair et al. (2022), PLS-SEM is appropriate for small sample sizes and complex exploratory studies. The approach builds on three types of analysis namely: path analysis, regression analysis, and principal component analysis. Using this approach does not require distributional assumptions or multi-item measures like other forms of SEM.

The two-stage approach toward the PLS-SEM analysis begins with the measurement model, which probes the relationships between

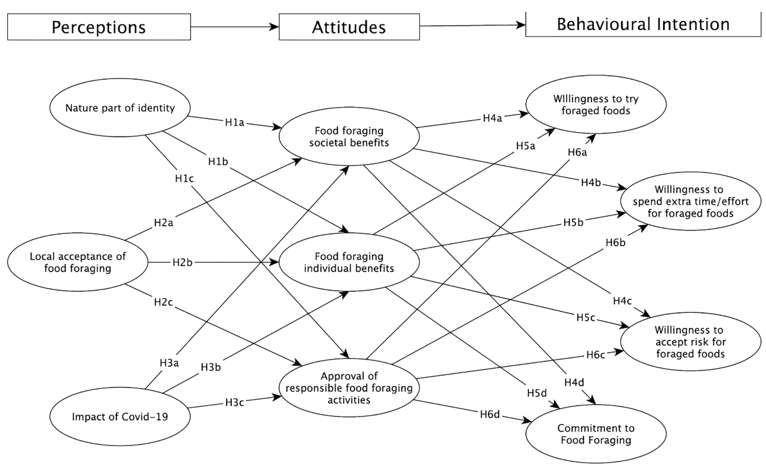

FIGURE 1
Conceptual model.

the observed data and the latent variables, followed by the structural model which examines whether any relationships exist between the latent variables. Firstly, the outer model analysis requires a series of checks for all multi-item scales. This involves checking indicator loadings on the respective construct. It is recommended that loadings are greater than the threshold of 0.4 (Hair et al., 2022). Further, convergence criteria need to be tested, whereby the average variance extracted is required to be greater than 0.5 (Hair et al., 2022). In addition, construct reliability and composite reliability are considered where both Chronbach's Alpha and composite reliability should be greater than 0.6 (Chin, 1998; Hair et al., 2022). Discriminant validity is verified through the Fornell-Larcker criterion and cross-loadings (Fornell and Larcker, 1981);, and the heterotrait-monotrait ratio of correlations criterion (HTMT). The threshold value for the HTMT is 0.9 and is considered a more refined approach to assessing discriminant validity (Henseler et al., 2015). Lastly, the variance inflation factor (VIF) determines whether multicollinearity within the data is an issue and is considered problematic when values are greater than 5.

The second step examines the inner model/structural fit of the model, as well as the explanatory power and predictive relevance of the model. In PLS-SEM studies, goodness of fit (GoF) measures are standard, even though Hair et al. (2022) recommend caution when interpreting these indices. GoF and Normed Fit Index (NFI) are typically used to indicate the model fit and higher scores typically indicate a better fit. Standardized Root Mean Square Residual (SRMSR) indicates a better fit if these values are small. SRMR values under 0.08 are deemed acceptable, while those which are over 0.10 are considered unacceptable (Hair et al., 2022). Finally, the explanatory power (R^2) and the predictive validity (Stone–Geisser criterion Q^2) are reported. R^2 values are interpreted as weak, moderate, or substantial if they are near 0.25, 0.50, and 0.75, respectively. Q^2 values larger than zero indicate good predictive validity, values higher than 0.25 indicate medium predictive relevance and values higher than 0.50 indicate strong predictive relevance (Hair et al., 2022). Once the inner and outer model analysis criteria are satisfied, the proposed hypotheses are tested.

4 Results and discussion

Table 1 displays the description of the sample along with a distribution from the most recent US census. For gender, 50.4% of the sample identified as men and 49.6% as women. In terms of geographical location, 51.6% of the participants resided in the South, followed by respondents from the Northeast, Midwest, and Western region at 26.2%, 16%, and 6% respectively. In terms of age, respondents between 25–34 years old were over-represented relative to census statistics and the elderly (age groups: 55-64 and 65+) were under-represented. Overall, the respondents were well educated with 61.6% of the sample holding a bachelor's degree and 21.9% a post-graduate degree. The median annual pre-tax income was between USD 50,000 and USD 75,000.

Tables 2a, 2b present the descriptive statistics, factor loadings, reliabilities, and convergent validity. Since all factor loadings are greater than 0.4, the constructs each contribute sufficiently to their respective scale. Individual benefits of food foraging had a Cronbach's Alpha of less than 0.6, but all other reliability scores were greater than 0.6, verifying the reliability of the measurement model. Given that all AVE scores were greater than 0.5, indicating convergent validity. This means that the requirements for construct reliability and convergent validity have been fulfilled.

The Fornell-Larcker and HTMT ratios are displayed in Table 3. For the Fornell-Larker criterion, the cross-loadings were less than the square root of the individual constructs' AVE and for the HTMT ratios, all were smaller than 0.90. In addition, the maximum VIF was 1.575 and the average VIF was 1.454, this indicates that multicollinearity did not affect the model. Together, this indicates that all criteria for discriminant validity have been satisfied and multicollinearity is not problematic.

The model can be considered to have an adequate fit with a GoF of 0.515, an NFI of 0.698, and an acceptable SRMSR of 0.069. The model has moderate explanatory power and strong predictive relevance due to the average R^2/Q^2 values of 0.310/0.250. This confirms that the model is an appropriate fit for hypothesis testing. Figure 2 shows that the explained variance for 6 of the 7 dependent variables were over 30% (R^2:0.3) indicating the model achieved weak to moderate explanatory power for most of the dependent variables.

Figure 2, Table 4 present the results of the hypothesis testing. Nature identity was significantly related to the societal and individual benefits of food foraging as well as the approval of responsible food foraging activities, supporting H1a, H1b, and H1c. The findings are in line with previous studies such as Niesbet (2009), Mackay and Schmitt (2019), Whiteburn et al. (2020), and Schunko et al. (2021). These studies indicate that a self-concept that includes the natural world is closely associated with pro-environmental behavior (Mackay and Schmitt, 2019; Whitburn et al., 2020). Schunko et al. (2021) comment very specifically on nature identity in a food-foraging context and explain that if a person feels closely related to nature, it is more likely they care for all living beings instead of caring only for themselves. This is reflected in foraging behaviors and practices, a forager with a caring mindset will approach food foraging with respect, gratitude, and awareness of nature (McLain et al., 2017; Schunko et al., 2021).

Similarly, local food foraging acceptance was significantly related to the societal and individual benefits of food foraging as well as the approval of responsible food foraging activities, supporting H2a, H2b, and H2c. When comparing these results with previous studies it becomes apparent that societal approval of food foraging depends on whether foragers act within legal boundaries and social norms (Clouse, 2022). According to Clouse (2022), property law, conservation acts, and the public perception of what constitutes appropriate use of landscape are the most important aspects of whether food foraging is accepted. Schunko and Brandner (2021) found contrasting results to the present study, as social acceptance, more specifically customary and legal knowledge, and practices of foragers, as well as the degree to which foragers perceive that food foraging is appreciated and accepted, was one of the major barriers. The explanation for these results is likely due to differences in the population sampling or underlying country differences. The work conducted by Schunko and Brandner (2021) stems from Vienna Austria and was specifically targeting urban dwellers, while the present study is dedicated to US consumers with an interest or experience in food foraging.

TABLE 1 Sample description.

	Freq	%	US Census
Age (StDev: 0.940)			
18-24	32	8.0	12
25-34	205	51.1	18
35-44	70	17.5	16
45-54	68	17.0	16
55-64	25	6.2	17
65 +	1	0.2	21
Total	401	100	100
Education (StDev: 0.927)			
Did not finish high school	3	0.7	11
Finished high school	28	7.0	27
Attended University	35	8.7	20
Bachelors Degree	247	61.6	29
Postgraduate Degree	88	21.9	13
Total	401	100	100
Household Annual Income (StDev: 1.141)			
$0 to $24,999	23	5.7	18
$25,000 to $49,999	98	24.4	20
$50,000 to $74,999	165	41.1	18
$75,000 to $99.999	94	23.4	13
$100,000 or higher	21	5.2	31
Total	401	100	100
Gender (StDev: 0.501)			
Male	202	50.4	49
Female	199	49.6	51
Total	401	100	100
Region			
Northeast	105	26.2	17
South	207	51.6	38
Midwest	64	16	21
West	25	6.2	24
Total	401	100	100

For the impact of Covid-19, only hypotheses H3a and H3b were supported, as the relationships between Covid-19 impact and the societal and individual benefits of food foraging were significant. The relationship between the Covid-19 impact and the approval of responsible food foraging activities was not significant. Overall, these findings are not surprising as Covid-19 brought hardship to many US households, required physical distancing, new ways to be in community with others, and a new appreciation of nature and desire to be involved in alternative forms of obtaining food (Bulgari et al., 2021). Clouse (2022) reported an increased interest in alternative food movements, including food foraging. The social and individual benefits such as community building, being outdoors as well as the opportunity to receive free food may be appealing to new as well as long-term food foragers (Schunko et al., 2021). The non-significant relationship between Covid-19 impact and approval of responsible foraging activities could be an indication that despite an increased level of desperation foragers experienced when facing supply and demand shocks, they were not willing to change their attitudes towards what is considered responsible foraging activities. In a regular shopping scenario, potential panic buying and hoarding

TABLE 2A Scale loadings, reliabilities, and convergent validity for multi-item scales.

Scales and Items	Mean	Std Dev	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Nature part of identity				0.722	0.843	0.641
I feel connected to nature and environment	5.898	0.964	0.820			
Nature is a part of my spiriality	5.885	1.074	0.776			
Nature is a part of my identity	5.848	0.991	0.806			
Local acceptance of food foraging				0.715	0.840	0.637
Where I live collectors respect areas where it is for forbidden to collect edible plants (conservation areas)	5.576	1.064	0.799			
Where I live collectors do not collect edible plants if classified as a protected species	5.594	1.163	0.765			
Where I live collectors are careful when collecting edible plants	5.726	1.021	0.830			
Impact of Covid-19				0.785	0.860	0.606
Since Covid-19, I am worried about high food prices for fruit and vegetables.	5.696	1.104	0.766			
Since Covid-19, I feel drawn towards self-sufficiency.	5.708	1.090	0.795			
Shortages in fruit and vegetables has led me to competitive and/or panic buying behaviour.	5.529	1.300	0.763			
Since Covid-19, I am committed to food processing and food preserving	5.571	1.182	0.789			
Food foraging individual benefits				0.565	0.821	0.696
Food foraging combines personal interests and the common good in our society	5.723	0.891				
Food foraging contributes to food security	5.763	0.964				
Approval of responsible food foraging activities				0.756	0.860	0.672
Approval: Collecting edible plants without leaving noticeable traces or damages.	5.721	1.086	0.803			
Approval: Respecting areas where it is for forbidden to collect edible plants (conservation area, private property)	5.616	1.090	0.846			
Approval: Being careful when collecting edible plants	5.840	1.018	0.811			
Commitment to Food Foraging				0.687	0.827	0.614
I am excited to share pictures about food that I collected on social media	5.494	1.167	0.787			
I consider myself a food forager	5.696	1.131	0.782			
I am part of food foraging group	5.484	1.388	0.782			

TABLE 2B Descriptive statistics for single-item scales.

Scales and Items	Mean	Std Dev
Food foraging societal benefits		
Food foraging contributes to social well-being and development of society	5.698	0.969
Willingness to try foraged food		
I am willing to try foraged food	5.776	0.887
Willingness to spend extra time/effort for foraged foods		
I am willing to spend the extra time/effort to obtain foraged food	5.651	0.990

(Continued)

TABLE 2B Continued

Scales and Items	Mean	Std Dev
Willingness accept risk for foraged foods		
I am willing to take a risk to obtain foraged food	5.611	1.170

TABLE 3 Scale discriminant validity.

Fornell-Larcker Criterion	A	B	C	D	E	F
A) Approval of Responsible Food Foraging Activities	0.820					
B) Commitment to Food Foraging	0.256	0.784				
C) Food Foraging Acceptance	0.467	0.557	0.798			
D) Food Foraging Individual Benefits	0.480	0.442	0.527	0.834		
E) Impact of Covid-19	0.325	0.559	0.438	0.460	0.778	
F) Nature part of Identity	0.496	0.517	0.495	0.459	0.528	0.801
Heterotrait-Monotrait Ratio	**A**	**B**	**C**	**D**	**E**	**F**
B) Commitment to Food Foraging	0.345					
C) Food Foraging Acceptance	0.631	0.795				
D) Food Foraging Individual Benefits	0.736	0.697	0.831			
E) Impact of Covid-19	0.410	0.780	0.578	0.677		
F) Nature part of Identity	0.665	0.746	0.689	0.714	0.703	

occurred as a response (Hobbs, 2020). Perhaps whether or not the foragers in this study were heavily impacted by Covid-19, they were able to maintain their standards of responsible foraging activities.

Concerning societal benefits of food foraging, a significant relationship between willingness to spend extra time and effort, accept risk, and commit to food foraging has been found, which is in support of hypotheses H4b, H4c, and H4d. Hypothesis H4a was not supported as no significant relationship between societal benefits and willingness to try was found. This may be explained as individual benefits are likely to be perceived as immediate compensation for time and risk since fruit and vegetables often require daily or weekly collection (Garekae and Shackleton, 2020). However, the societal benefits may be more intangible and less directly associated with immediate needs.

For the individual benefits of food foraging, significant relationships between willingness to try foraged food, willingness to spend extra time and effort, and commitment towards food foraging have been found, which is in support of hypotheses H5a, H5b, and H5d. These results indicate that foragers gain utility through individual benefits and perceive the time and commitment that is required to receive food as a trade-off that they are happy to make. Hypothesis H5c was not supported as no significant relationship between individual benefits and willingness to accept risk was found. The non-significant results may be explained by the fact that the risks

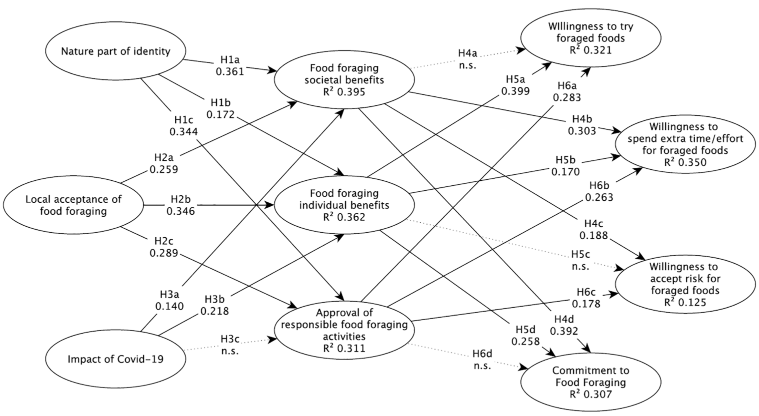

FIGURE 2
Conceptual model results. n.s., not significant.

TABLE 4 Path Coefficients.

Hypothesised Relationship	Coefficient	T Stat	P Value
H1a: Nature part of Identity -> Food Foraging Societal Benefits	**0.361**	5.312	0.000
H1b: Nature part of Identity -> Food Foraging Individual Benefits	**0.172**	2.449	0.014
H1c: Nature part of Identity -> Approval of Responsible Food Foraging Activities	**0.344**	3.516	0.000
H2a: Local acceptance of food foraging -> Food Foraging Societal Benefits	**0.259**	4.882	0.000
H2b: Local acceptance of food foraging -> Food Foraging Individual Benefits	**0.346**	5.831	0.000
H2c: Local acceptance of food foraging -> Approval of Responsible Food Foraging Activities	**0.289**	3.904	0.000
H3a: Impact of Covid-19 -> Food Foraging Societal Benefits	**0.140**	2.514	0.012
H3b: Impact of Covid-19 -> Food Foraging Individual Benefits	**0.218**	3.729	0.000
H3c: Impact of Covid-19 -> Approval of Responsible Food Foraging Activities	0.017	0.205	0.837
H4a: Food Foraging Societal Benefits -> Willingness to Try Foraged Food	-0.044	0.819	0.413
H4b: Food Foraging Societal Benefits -> Willingness to Spend Extra Time/Effort for Foraged Foods	**0.303**	5.68	0.000
H4c: Food Foraging Societal Benefits -> Willingness to Accept Risk to Forage Food	**0.188**	2.925	0.003
H4d: Food Foraging Societal Benefits -> Commitment to Food Foraging	**0.392**	7.093	0.000
H5a: Food Foraging Individual Benefits -> Willingness to Try Foraged Food	**0.399**	5.688	0.000
H5b: Food Foraging Individual Benefits -> Willingness to Spend Extra Time/Effort for Foraged Foods	**0.170**	2.795	0.005
H5c: Food Foraging Individual Benefits -> Willingness to Accept Risk to Forage Food	0.072	1.196	0.232
H5d: Food Foraging Individual Benefits -> Commitment to Food Foraging	**0.258**	4.875	0.000
H6a: Approval of Responsible Food Foraging Activities -> Willingness to Try Foraged Food	**0.283**	4.19	0.000
H6b: Approval of Responsible Food Foraging Activities -> Willingness to Spend Extra Time/Effort for Foraged Foods	**0.263**	4.417	0.000
H6c: Approval of Responsible Food Foraging Activities -> Willingness to Accept Risk to Forage Food	**0.178**	2.248	0.025
H6d: Approval of Responsible Food Foraging Activities -> Commitment to Food Foraging	-0.028	0.397	0.691

Bold=P<0.05.

involved in food foraging are mostly legal and breaching property law and conservation acts constitute punishable offenses (Schunko et al., 2021). In some US towns and cities, the act of food foraging is completely prohibited, or popular places with fruit trees are not authorized for foraging (Shackleton et al., 2017; Clouse, 2022). Foragers may not be interested in conflict with the law.

In terms of approval of responsible food foraging activities, a significant relationship between willingness to try foraged food, willingness to spend extra time and effort, and willingness to accept risk has been found. This is indicating support for hypotheses H6a, H6b, and H6c. Hypothesis H6d was not supported as no significant relationship between approval of responsible food foraging activities and commitment was found. Given that commitment has a long-term character and involves a component of sharing and public communication of food foraging activities (Hearn et al., 2014; Clouse, 2022), perhaps those who are dedicated to responsible food foraging may not be able to make a long-term commitment to the activity.

5 Conclusion

The present study focused on key factors driving consumer willingness to try foraged food, willingness to spend time and effort, accept risk, and commitment to food foraging. The study highlighted that nature identity and local acceptance of responsible food foraging activities were strong drivers of societal and individual benefits of food foraging and approval of responsible food foraging activities. Interestingly, the strongest driver of willingness to try are the individual benefits of food foraging but the strongest driver of willingness to spend extra time and effort are the societal benefits associated with food foraging. The willingness to accept risk, approval of responsible food foraging activities, and the societal benefits of food foraging were moderate predictors and for commitment to food foraging, the societal followed by individual benefits are the most important drivers. These findings are of relevance to various societal stakeholders, for instance, municipalities, landscaping designers, nursery businesses, and marketing managers in gastronomy and the food industry specializing to promote foraged or local food items.

The societal benefits associated with food foraging, such as knowledge and community are an opportunity for nurseries and other horticultural producers to capitalize on by providing education and awareness of the importance of plant knowledge dedicated to local, traditional, and ethnic plants. Books, educational videos, and workshops are means of implementation. Similarly, municipalities are called to provide information on the aspects of legality related to protected species and conservation areas. To protect the foragers and the vegetation in conservation areas, signs that indicate approved and protected areas would be helpful. In collaboration with botanic gardens, municipalities and communities could offer local foraging tours that point out appropriate areas and plants as well as the principles of responsible food foraging practices. In cities where urban horticulture and food foraging are widespread, municipalities may need to recognize this aspect of culture by maintaining, extending, and implementing edible landscapes, beyond existing spaces. Marketing managers in the gastronomy and the food industry could use the concepts of naturalness, home, and nature identity to promote local and foraged food. This may be realized through means of experiential marketing and could involve in-store events, where foraging areas and products are showcased and shared to assure a memorable consumer experience.

Future research could deepen the understanding related to foraging commitment and distinguish between group and individual foragers. In a group context, a study dedicated to normative, affective, and continuance commitment to understanding the motives of group foragers and the true nature of their commitment would add to the body of literature on forager knowledge. In addition, future studies may expand the focus on willingness to try from the results of the present study. Such a study may involve sensory characteristics of food, food attributes, and psychological concepts related to food, such as food curiosity and food neophobia. However, the nature of food foraging may suggest that curiosity is a better fit for the investigation. Lastly, studies could build on Schunko et al. (2021) and explore differences in plant and legal knowledge among food foragers.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by The study and the protocol was approved by the Human Ethics Committee at Lincoln University, New Zealand in 2022 (HEC2022-40). The patients/participants provided their written informed consent to participate in this study.

Author contributions

Conceptualization, MR and DD. methodology, DD. validation, MR, DD formal analysis, DD. investigation, MR and DD. re-sources, MR, DD, writing—original draft preparation, MR. writing—review and editing, DD. project administration, MR and DD. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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