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Consumer Behaviour in Sourcing Meals during COVID-19: Implications for Business and Marketing

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Abstract: The subject of this study is consumer behaviour in sourcing meals and the manifestation of different behavioural patterns before and during the COVID-19 pandemic. The natural experiment, which COVID-19 represents, provides fertile ground for studying consumer behaviour and identifying important factors influencing consumer attitudes in sourcing meals and accessing food. To achieve its aim, this study draws from theories of social psychology and economics as a background for understanding the factors and processes affecting attitudes. Using survey data and qualitative and quantitative analysis the study established that the attitudes of sourcing meals remained quite stable since the COVID-19 pandemic began. Contemporary consumer experiences are primarily associated with health and safety concerns and are conditional on financial affordability. Nevertheless, advertisements and marketing campaigns remain an important factor during COVID-19. Social media platforms have grown in importance as a channel through which consumers can be reached for their food access behaviours.

Keywords: consumer behaviour; attitudes; food sourcing; meal preparation; marketing; latent class models; COVID-19

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1. Introduction

Understanding antecedents and trends in consumer behaviour is essential for business growth and success. Therefore, the subject of this study is the behaviour of consumers in sourcing meals and the manifestation of different behavioural patterns before and during the COVID-19 pandemic. It would be interesting to extend this study to consumer behaviour after the pandemic, but at the time of the study it was not possible to identify the end of the pandemic. The study contributes to the new and growing literature on the impact of the COVID-19 pandemic on consumer attitudes and behaviour associated with limited social and economic interaction, due to the lockdowns, and the interruption of supply chains. There are two main types of studies on the above issues—literature review papers, which emerged very quickly after the pandemic began (e.g., [1–3]), and empirical evidence papers based on early pilot surveys or data from government agencies (e.g., [3–5]). The early empirical papers are mostly descriptive, and only a few studies focus on analysing the data in more depth (e.g., [6]). Our research attempts to contribute to this analytical segment of the literature. The results of our research should be of interest to the food and, more widely, hospitality industries in developing their marketing strategies and campaigns.

Consumer behaviour is studied from many different perspectives, in different disciplines—from psychophysiology [5,7,8] to business and economics [9–12] to management and communication research [13–15]. In this way, the consumer phenomenon, more generally, can be studied in different ways and at different levels of abstraction, depending on the discipline and interests of the researcher. Areas of interest can be described as focusing on topics about the behaviour of micro or macro users [16–18]. On the one hand, there may be a focus on individual consumers (micro-problems), while on the other hand,

there may be a greater interest in aggregate activities that take place in larger groups, such as consumption patterns shared by members of a culture or subculture (macro-problems).

In this study, we largely followed the general positivist approach to research, while maintaining an open mind to interpretivist ideas that could enrich the analysis. Consumer behaviour about access to food is influenced by many factors, such as the consumer's environment, consumer preferences and attitudes, and the cost of obtaining, preparing, delivering, storing, and consuming food [19]. People usually access food in three main ways: eating out, ordering food home, including on food platforms (such as Just Eat and Deliveroo), and cooking at home. These three ways of accessing food are underlined by two main types of consumer attitudes, forming two main consumer segments—consumers who prefer to source their meals by cooking on their own, at home, and consumers who source food from outside their home, prepared by others. Food access choices and food supplies have the following characteristics:

- They are common due to the availability and affordability of food access options, especially in developed countries [20].
- They are multidimensional, related to several behaviours adopted during different stages of food consumption [19].
- They are contextual, influenced by time, activity, or society as a whole [21].
- They are dynamic, changing with changes in the environment and personal situations [22].
- They are complex, involving several culturally motivated considerations of what to eat, when, where, and with whom [21].

Therefore, as with any complex human behaviour, the access to food, and meal sourcing behaviours are influenced by many interrelated factors affecting food choice, rather than just a single factor [23].

The advent of the COVID-19 pandemic has added another layer of complexity to accessing food and sourcing meals related to food safety concerns and access restrictions. The COVID-19 lockdown restrictions were introduced to limit interpersonal contact and transmission of the virus. The lockdown limited the number of hours allowed for outdoor physical activity, access to food options, and generally has a serious impact on an individual's lifestyle and attitudes [24]. Both negative and positive changes in eating behaviours emerged from the COVID-19 pandemic, such as increased consumption of fast food, on the one hand, and more time for home cooking, on the other. The natural experiment, which COVID-19 represents, provides fertile ground for studying consumer behaviour and identifies important factors influencing consumer attitudes in sourcing meals and accessing food. Thus, the aim of this study is to conduct a qualitative, survey-based research, augmented with quantitative analysis of consumer behaviour and attitudes before and during the COVID-19 pandemic. The main three objectives are: (i) to identify the main consumer segments in terms of meal sourcing according to their main preferences and attitudes; (ii) to study the factors influencing the behaviour of the consumer segment in terms of access to food and other demographic and economic factors; and (iii) based on the findings of the analysis of the drivers of consumer behaviour, to derive implications for marketing in the food and hospitality sectors. The study will be guided by three related research questions (RQ):

RQ1: Are there any changes in preferences and attitudes towards meal sourcing during COVID-19 compared to the pre-COVID-19 situation?

RQ2: What are the main factors affecting consumer attitudes toward accessing food and sourcing meals, in general, and during COVID-19?

RQ3: What are the implications of COVID-19 for business and marketing in the food and hospitality industries?

The study is organised as follows. Section 2 presents a literature review and Section 3 describes the materials and methods of the study, including the survey instrument and estimation methodology. Section 4 reports results of the data analysis, Section 5 offers a discussion of the results, and Section 6 concludes and points out the limitations.

2. Literature Review: COVID-19 and Food Consumption

Several previous studies have demonstrated the necessity of looking at consumer behaviour in times of global crisis [25–27]. The literature points out the supply and demand disruptive impacts of the COVID-19 pandemic, affecting both agri-food systems and food consumption behaviours [1,6]. In this section, we selectively review aspects of the literature relevant to our research focused on consumer behaviour in terms of sourcing food. For completeness, we outline the main issues in a wholistic framework involving both supply and demand sides.

On the supply side, the outbreak of COVID-19 has threatened the smooth functioning of food supply chains. Limits on the mobility of people, border restrictions, and employee absenteeism due to lockdowns contribute to labour shortages in agricultural production and processing in many countries [28,29]. These problems are further exacerbated by logistics interruptions and disruptions in supply chains and limited access to markets for selling food products [30,31]. The disruptions along the food supply chain, have sometimes resulted in unsold agricultural products and in significant increases in food loss and waste, especially of perishable products, such as fruits and vegetables, fish, meat, and dairy [32].

On the demand side, as the COVID-19 pandemic unfolded, the way people purchase and consume food has changed [4]. Kirk and Rifkin [33] argue that the reaction of consumers to a pandemic consists of three stages: reacting by stockpiling goods, coping by maintaining social relations through virtual gatherings, and longer-term adaptation by modifying individual and societal behaviour and consumption.

A strong initial effect on consumer behaviour has been the "panic buying" of non-perishable food items, such as pasta, rice, canned goods, flour, and frozen foods [34]. Panic buying is commonly found as a human response to a crisis, not caused by food shortages, but rather by a fear of running out of food [35]. Furthermore, some consumers may stockpile food to reduce their perceived risk of exposure to COVID-19 when visiting shops [1]. Fanelli [3] analysed two surveys on COVID-19 and food safety issues found that in one survey 70% of respondents declared that food safety was an important concern for them during the COVID-19 pandemic, while in the other survey only 1.3% were of the same opinion.

The unfolding COVID-19 pandemic has changed people's eating and dietary patterns, leading to a deterioration of nutritional and health status at both the individual and country level [36]. One important channel through which the pandemic affects consumers is by affecting their quality of diet. Consumers are shifting towards greater consumption of processed foods, such as convenience foods, junk foods, snacks, and ready-to-eat meals [24]. The shift could occur for various reasons, e.g., as a result of stockpiling of foods with a longer shelf-life, and supply chain disruptions [37]. There is also a possibility of a decrease in meat consumption as a result of fears (not science-based) that animals might be hosts of the virus [16]. However, previous coronavirus-related outbreaks, especially MERS-coronavirus and SARS-coronavirus, have shown that food is not a transmission pathway for these specific viruses [38].

There are also drastic changes in lifestyles caused by the lockdown/quarantine that have resulted in negative emotions, depression, stress, and fear of the disease [5,39]. Such negative emotions could lead to overeating, and "emotional eating" [40], especially of "comfort foods", which tend to be high in salt, fats, and sugars [41,42].

Other than the psychological impact of COVID-19 on food consumption and diet, there is also an economic one affecting demand for food through changes in incomes and prices [1,25,43]. Huang et al. [10] and Pantano et al. [44] have shown that consumer price elasticity is significantly affected by a crisis, such as COVID-19. Furthermore, worries about the future might lead some people to reduce their expenditures, including those for food [4,45].

Importantly, the COVID-19 pandemic also affects where and how consumers buy their food [1]. With the shutdown of restaurants and cafes, food purchases have switched to grocery stores [46] as consumers' buying patterns rapidly shift to online shopping [47].

Baker et al. [48] reported for the USA a significant increase in food delivery spending, associated with households substituting meals at restaurants with meals at home.

So far, our review has pointed out mostly negative effects. However, the COVID-19 pandemic has also had some positive effects on food consumption [49]. For example, Ben Hassen et al. [6] found in Qatar a shift toward a healthier diet during the COVID-19 pandemic. Prioritising their health, people have also limited the number of ready meals that they order from restaurants for fear of unnecessary exposure. Due to the spread of the pandemic, principles of nutrition, including the timing of meals and the consumption of nutritious food for strengthening one's immune system, have increased in importance during the lockdown period [50]. Similarly, 21.2% of an Italian sample, which was surveyed by Scarmozzino and Visioli [45], boosted their consumption of fresh fruit and vegetables during the lockdown period. This increased consumption should be viewed as positive due to the protective effects of fruit and vegetables due to their micronutrient, vitamin, and fibre content [51,52]. Di Renzo et al. [53] found in a survey of Italian consumers conducted in April 2020 that 37.4% of the sample increased the consumption of healthier food. Ruiz-Roso et al. [54] also found in an international survey of adolescents in Spain, Italy, Brazil, Colombia, and Chile conducted in April–May 2020, positive changes in dietary patterns.

Perhaps the most important positive change due to COVID-19 is the rise of home cooking and baking [24]. Since restaurants and coffee shops have been closed, consumers are turning to home-prepared meals. With lockdown confinement, it is much easier to find time for home cooking activities, even for professional people who usually are restricted by the hectic pace of daily life [6]. A food industry association survey—"U.S. Grocery Shopper Trends: The Impact of COVID-19"—conducted in February–April 2020 in the USA revealed that 41% of Americans cooked more, 27% planned more meals in advance, and 20% tried new dishes more often since the start of the pandemic [55]. Home cooking has also been associated with positive psychological effects, countering the negative ones associated with the lockdown. Ben Hassen et al. [6] found that 43% of the households in Qatar were eating together, family meals, 49% were cooking and preparing food much more frequently, and 54% were spending a lot of time cooking.

Hubbub [56] research shows that approximately 90% of a representative sample of 2000 adults surveyed in the United Kingdom have changed their cooking and eating habits since the imposition of the national lockdown in March 2020. These changes include spending more time cooking with family or neighbours (47%); enjoying cooking at home (44%); and "sharing" virtual meals over Zoom, Skype, Facetime, etc. (40%). Moreover, the people interviewed planned to continue with their new shopping and cooking habits after the lockdown.

A study by Datassential [57] of 1000 consumers in the United States that was conducted in March 2020 revealed that 69% of people preferred to cook at home and 54% did not prefer to eat at sit-down restaurants. Moreover, according to a quantitative survey conducted online in April 2020, many Americans spent more time engaging in household activities, such as cooking and baking [58].

Another positive COVID-19 effect is the reduction in food waste. Jribi et al. [59] found that the COVID-19 lockdown improved food grocery shopping efficiency and pushed toward a positive behavioural change regarding food wastage in Tunisia. Similar findings were reported by Ben Hassen et al. [6] for Qatar.

Despite the generally uniform changes reported across countries, there are also some heterogeneous effects of COVID-19. While in Qatar, Ben Hassen et al. [6] reported several positive effects of COVID-19 on food consumption behaviour, the tendency in Qatar is different from what has been observed in other countries. In the USA, Canada, and Italy, for example, consumers have shifted towards greater consumption of unhealthy food, as a result of panic buying and negative emotions, such as boredom, depression, anxiety, and fear of the disease [37,60].

The differential trends in Qatar can be explained by the government's measures supported by favourable demographics (only 1% of the Qatari population is aged 65 or

more) and a capable healthcare system [61]. These factors have helped to reduce the spread of negative emotions, such as worriedness, depression, and fear of the disease, thus, eventually, resulting in less consumption of unhealthy and "comfort" foods.

It is noteworthy that because the change in consumer behaviour is driven partly by feelings of fear toward the virus [62], as long as the perceived danger is low or decreasing, there is an expectation and some evidence of a reversal in behaviour to pre-COVID-19 patterns [63]. Fanelli [3] found that regarding eating habits and food-related behaviour during the lockdown period, most participants in a pilot study indicated that they had not changed their diet. However, there was evidence of changes in the access to food. People were spending more time eating at home as dining out became less accessible.

Many scholars, however, hold the opinion that there will be long-lasting changes in consumer behaviour in the aftermath of the pandemic. Bree [64] argues that developing a new habit usually requires a time period of approximately 3 weeks. The COVID-19 crisis has clearly lasted much more than 3 weeks, and therefore, what started as a change in consumer behaviour may have now arguably morphed into a habit. However, the survey results of Romeo-Arroyo et al. [65] for Spain during the COVID-19 pandemic revealed that only 20% of the participants were expected to maintain healthy habits after the national lockdown had been lifted. Therefore, understanding the societal response to the COVID-19 phenomenon is a challenging and worthy matter.

3. Materials and Methods

The theoretical foundations of this empirical study are a combination of social and economic psychology theory—the Ajzen and Fishbein's [66] theory of reasoned action—and the general economic theory of demand. We also borrowed ideas from the analytical framework developed by Rabbi et al. [31] incorporating the theory of food security (e.g., [67]. The underpinning (theoretical) premise is that consumer behaviour is a function of attitudes towards (preferences for) a product or service, associated with individual consumer characteristics, and environmental factors, including incomes and prices. A survey methodology was chosen for the study, as it can objectively describe and measure consumer attitudes and other antecedents leading to observed behaviours by collecting data at relevant points in time [68,69]. In addition, the survey methodology has been widely used to assess food consumption behaviours in numerous previous studies (e.g., [70–72]).

3.1. Data Collection and Survey Design

3.1.1. Survey Design and Ethics

Given the research objectives of this study and the underlying theories, the target population of the study is adults aged 18 years and over. The aim is to cover a diverse sample, approximately, representative of the whole population. The sampling technique chosen is snowball sampling, which is a non-probability sampling method where currently enrolled research participants help recruit future subjects for the study [73,74]. Non-probability sampling means that researchers, or other participants, choose the sample as opposed to randomly selecting it. In other words, snowball sampling method is based on referrals from initial subjects to generate additional subjects. Thus, members of the sample group are recruited via chain referral. Snowball sampling is a cost-effective way of creating relevant samples. It is particularly appropriate in contexts where the researcher needs to quickly reach a non-easily reachable population, as in the case of the COVID-19 lockdown. A limitation of the method is that it is not possible to determine the sampling error.

There are three patterns of snowball sampling [73,75]:

- Linear snowball sampling: Formation of a sample group starts with only one subject, and the subject provides only one referral. The referral is recruited into the sample group, and he/she also provides only one new referral. This pattern is continued until the sample group is fully formed.

- Exponential non-discriminative snowball sampling: The first subject recruited to the sample group provides multiple referrals. Each new referral is explored until primary data from a sufficient number of individuals is collected.
- Exponential discriminative snowball sampling: Subjects give multiple referrals, however, only one new subject is recruited among them. The choice of a new subject is guided by the aim and objectives of the study.

Exponential non-discriminative snowball sampling was employed in this study as the steps of recruiting the sample were as follows: (1) We formed an initial sample by drafting potential subjects from the target population such that they were representative of the composition of the population in terms of gender, age, ethnicity, and marital status. (2) Those subjects were asked to recruit other individuals for the study. They recruited subjects by encouraging them to come forward on their own. The assumption was that originally recruited subjects would approach individuals from the same population category, thus, retaining the composition of the initial sample. A further condition was that study participants did not identify any names of other potential participants. (3) The initial sample participants continued to recruit others until the necessary sample size had been reached. For this study, a convenience target sample size of 100 individuals was set [75]; this sample size is in line with other relevant studies (e.g., [3,5]). The survey was conducted through an online questionnaire in two weeks in January 2022.

Following the good practice of collecting survey data in business research [76], prior to the survey, an approval by the Institutional Review Board (IRB) of the University of Lincoln through the LEAS online process was obtained. In the questionnaire, it was made clear that participation in the survey is voluntary and completely anonymous and does not involve the collection of sensitive personal information. In addition, participants were informed about the purpose of the survey and the use of the data, emphasising that the information collected will be used exclusively for this study and confidentiality will be guaranteed.

3.1.2. Questionnaire Design Considerations

This questionnaire is specifically designed to analyse consumers' attitudes towards sourcing meals and consumer behaviours in accessing food from different sources. The questionnaire includes three main parts: consumer/individual profile, behaviour, and attitudes towards access to food before COVID-19, and changes in behaviour after the start of the COVID-19 pandemic. The sections on attitudes and behaviours associated with access to food are especially designed to support the comparative analysis before-and-after COVID-19. In particular, the information gathered helps identify established consumer attitudes and behaviours and then compares attitudes and behaviours associated with the current (during COVID-19) period.

It is worth noting that the questionnaire contains different styles of questions—both questions with closed and highly structured answers, and open questions that allow individual feedback from respondents. For many questions, the answers are recorded on a five-point Likert scale, as is common in related studies. The questionnaire also contains some open-ended numerical and multiple, ranking-answer questions to establish a clear identification of the consumer attitudes. The variety of question styles provides better opportunities for obtaining a richer set of information.

To ensure the reliability of the questions, and ultimately the results of the study, a preliminary pilot survey was conducted to test for possible deficiencies in the questionnaire. Preliminary testing helps ensure that the questions are relevant to the target audience, before the survey is actually administered, as well as minimises subsequent measurement errors. In this study, the development of the questionnaire was informed by a pilot survey conducted in July 2021 on 33 individuals. Although, considering the gap in time, this is not an ideal situation, the preliminary analysis of the pilot survey helped identify problems with the content and understanding of some questions. Based on the comments collected during the pilot stage, the final version of the questionnaire was significantly improved.

Each part of the questionnaire has a specific purpose. The first part examines the demographic characteristics of consumers, asking questions about age, gender, marital status, family composition, ethnicity, education, and employment status. Based on this information, combined with information on expenses, the income status of the respondents can be established. The second part examines (asking retrospective questions) the attitudes and behaviours associated with sourcing meals before COVID-19. The aim was to identify the ways in which respondents choose to access their food and to collect information about the characteristics of the food access regimes—specific factors, such as food costs, available time, etc. The willingness to pay is also explicitly measured by collecting information on the prices paid in each mode of accessing food. The third section examines the same issues as in section two, but since the beginning of the COVID-19 pandemic and the associated lockdown impact. In addition, the scope is to understand what consumers consider important when accessing food and catering options during the pandemic—especially health and safety considerations. The questionnaire is available online at Supplementary Materials.

3.2. Estimation Methodology

3.2.1. Specifying a Latent Class Model

As mentioned earlier, the relevant theories suggest that consumption decisions are determined by consumers' attitudes toward a product or service. Attitudes are formed based on intrinsic preferences and the attributes that the product or service possesses. In line with this theoretical view, Lancaster's [77] random utility theory has been employed, where consumers add utility to the consumption of each good and service and choose the good or service that provides the highest utility derived from the respective attributes it possesses.

The related statistical approach describes discrete choices or consumer behaviours resulting from utility maximization [78,79]. This approach leads to the latent class model (LCM) that we employ to analyse individual attitudes towards sourcing meals by cooking at home or sourcing meals prepared by others, outside the home. The key assumptions of the LCM are that the population consists of a number of unobserved (or latent) consumer groups (market segments), each with relatively homogeneous preferences and attitudes [79], while these segments are thought to differ significantly from each other in their preferences and attitudes. The main goals in evaluating the LCM are to identify the existence and number of segments, to assess the structure of each segment, and to link the membership in each segment with the characteristics of the consumers. In particular, we examine the behaviours of consumer segments with different attitudes and preferences for sourcing meals.

LCMs have long been used in market research [80–82]. Following the literature, it is assumed that user n faces a choice of a preferred alternative from a set of $J = 3$ alternatives in total. In this study, the three alternatives are eating out in restaurants, ordering takeaways, or cooking at home. The attributes of alternative j that user n faces are denoted as a vector X_{jn} (the main attributes are price, familiarity, safety, etc.). In addition, suppose that consumer n belongs to one of the three latent segments s—sourcing meals prepared by cooking at home, sourcing meals prepared by others outside the home, or sourcing meals by mixing cooking at home and food prepared outside the home (mixed meal sourcing mode). Then the consumer utility function associated with the preferred alternative j is:

$$U(jn|s) = u_{jn} + \beta'_s X_{jn} + \varepsilon_{jn|s}, \quad (1)$$

where u_{jn} is intrinsic utility of the alternative of sourcing meals, β'_s represents the segment-specific preference parameters to be estimated, and ε_{jn} is a random term that is assumed to be independent and identically distributed. The probability that an individual n chooses

alternative j, conditionally belonging to a given segment s, is given by the multinomial logit model [79]:

$$P(jn|\beta_s) = \frac{\exp\left(u_{jn} + \beta'_s X_{jn}\right)}{\sum_{j=1}^{J} \exp\left(u_{jn} + \beta'_s X_{jn}\right)}. \quad (2)$$

Following Kamakura and Russel [79] the simplest formulation of the probability that an individual n belongs to segment s, $P(s)$ is specified in the standard multinomial logit form as follows:

$$P(s) = \frac{\exp(\sigma'_s Z_n)}{\sum_{s=1}^{S} \exp(\sigma'_s Z_n)}, \quad (3)$$

where Z_n is a set of observed individual characteristics, specifically attitudinal factors affecting food access choices that are included to explain segment membership, and σ'_s is a vector of segment-specific parameters to be estimated that denote the contribution of the various attitudinal factors to the probability of segment membership.

In our empirical analysis, the aim is to identify segments within the surveyed consumers that differ from each other with respect to attitude factors (consumer-specific variables) and behaviours towards variation in prices and attributes of the food-access alternatives (alternative-specific variables). This approach calls for aggregation of the probabilities in Equations (2) and (3), which results in a log-likelihood function, leading to a complex mixed logit model (MLM) [83]. As an approximation to the MLM, a standard multinomial model is used in this study where both consumer-specific variables and food-access, alternative-specific variables are included [79,84]. In addition, factors associated with the COVID-19 pandemic are also included.

3.2.2. Identifying Market Segments

Consumers who have clear preferences for home cooking and thus, sourcing meals at home are defined as those consumers who reported that they cook at home at least 'Often' (the top two categories in the 5-step Likert scale). This information is collected through a set of screening questions that measure the access/purchase frequency for each food-access alternative—eating out in restaurants, ordering takeaways, or cooking at home. The consumers who hold clear preferences for sourcing meals from outside their homes were identified in a similar manner, but using screening questions that measure the frequency of eating out in restaurants or ordering takeaways. It is natural to end up with a category of consumers who do not fall into any of the two 'extreme' segments. These consumers are classified as the *hybrid segment* where consumers prefer to mix access to food alternatives and thus, exhibit preferences for a variety in sourcing meals—both by cooking at home and by sourcing meals from outside their homes, cooked by others.

It is important to point out that the market segmentation identified in this study is not affected by the tendency of averaging, discussed by Dhar and Simonson [82], who show that, if forced to choose, participants tend to choose alternatives with average attribute levels. The food access alternatives offered actually capture the full set of options facing consumers in the market [79]. Furthermore, each frequency screening question contains a 'Never' option as advised by Dhar and Simonson [82]. The questions on access frequency were asked both before and during the COVID-19 pandemic. Using the pre-pandemic responses, it is possible to identify the stable, long-term attitudes of the consumer. Furthermore, the relevance of the segmentation can be verified following Kamakura and Russel [79] when estimating the multinomial logit model by using the Bayesian information criterion (BIC). It is also possible to test for any changes in the market segmentation since the COVID-19 pandemic began by using (rank) correlation analysis of the two segmentation structures—before and after COVID-19 began. The outcomes of the tests will be discussed in the following results section.

4. Results

4.1. Descriptive Analysis

4.1.1. Sample

The total valid number of cases in this study was 117 out of 121 total responses. Most consumers in the sample were in the 26–50 year range, which agrees with the national age distribution [85]. In terms of gender split, female respondents constitute 60% of the sample, which roughly agrees with the national distribution. With an average of 3.09 persons per household, the sample also roughly agrees with the mean household size in the UK of 2.5 persons [85]. More than half of the households have young children (younger than eight years of age). The proportion of participants with a college or university degree in the sample is above average. This corresponds with other studies showing above-average education of food-cautious consumers that we have surveyed [86].

4.1.2. Observed Consumer Behaviour in Accessing Meals

The consumer's behaviour regarding access to food is depicted in Table 1. Out of the three options available, cooking at home is the most popular one, with most consumers reporting using this option 'Regularly'. The other two options—eating out in restaurants and ordering takeaways—are about equally popular and used 'Rarely' on average. It is interesting to point out that the relative popularity of the two options has changed such that the more popular option of eating out in restaurants pre-COVID-19 has been swapped for ordering takeaways since COVID-19 by the consumers. This change has been accompanied by a slight increase in the popularity of cooking at home since COVID-19. It is also important to note that the Spearman's rank coefficients calculated for each pair of food access options, before and after COVID-19 started, demonstrate that there is no statistically significant change in consumer behaviour, i.e., the null hypothesis (Ho) of independence is always rejected at Prob > 0.001.

Table 1. Consumer behaviour: food access modes.

Variable	Eating in Restaurants		Ordering Takeaways		Cooking at Home	
	Freq.	**Perc.**	**Freq.**	**Perc.**	**Freq.**	**Perc.**
			Pre-COVID-19			
Never	2	1.71	26	22.22	2	1.71
Rarely	73	62.39	74	63.25	7	5.98
Sometimes	28	23.93	14	11.97	20	17.09
Often	10	8.55	3	2.56	27	23.08
Regularly	4	3.42	0	0	61	52.14
Total	117	100	117	100	117	100
Average	2.495	0.816	1.948	0.667	4.179	1.030
			Since COVID-19			
Never	29	24.79	25	21.37	0	0
Rarely	76	64.96	66	56.41	4	3.42
Sometimes	8	6.84	17	14.53	9	7.69
Often	3	2.56	9	7.69	28	23.93
Regularly	1	0.85	0	0	76	64.96
Total	117	100	117	100	117	100
Average	1.897	0.699	2.085	0.815	4.504	0.783
Correlation	0.334	0.001	0.610	0.001	0.640	0.001

Notes: In the Correlation row Spearman's Ro correlation coefficient is reported together with Prob (level of significance) for the test of the Ho of independence; for all three pairs Ho is rejected. In the Average row mean and standard deviation is reported.

4.1.3. Preference Segmentation

The stability of consumer behaviour observed is associated with the types of preferences and attitudes consumers hold. As discussed in the previous section, the market segmentation we analyse comprises three consumer groups (segments). Each consumer segment contains homogeneous consumers, but the consumer characteristics of each segment differ in some important ways. In this section, first the consumer segments are described by the means of summary statistics of a range of demographic and other variables, which are reported in Table 2. Next, following the estimation methodology in Section 3.2, the segment structure is verified and the factors affecting it are estimated.

Table 2. Consumer segments: attitudes to sourcing meals.

Indicator/Variable	**Sourcing Meals by Cooking at Home (A)**		**Sourcing Meals from Outside the Home (B)**		**Mixed Mode of Sourcing Meals (C)**	
			Segment structure			
Indicator	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.
Pre-COVID-19	83	70.94	11	9.40	23	19.66
Since COVID-19	94	80.34	2	1.71	21	17.95
Correlation	0.549 (0.001)					
			Segment demographic characteristics			
Variable	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Age	3.783	0.827	3.181	0.981	3.260	1.053
Gender (female)	0.674	0.471	0.272	0.467	0.565	0.506
Ethnicity	2.325	1.506	2.272	1.420	2.217	1.475
Marital status	2.048	0.518	1.818	1.250	2.130	0.757
Household size	3.325	1.169	2.454	1.507	3.347	1.335
Children below 8y	0.614	0.489	0.090	0.301	0.521	0.510
Education	3.731	0.703	4.000	0.000	3.652	0.647
Digital skills	3.182	0.755	3.090	0.943	2.826	0.777
Employment status	2.597	1.878	2.363	1.858	2.869	2.029
			Additional characteristics			
Price	2.883	0.887	2.997	1.127	3.188	0.754
Financial constraint	0.385	0.489	0.545	0.522	0.217	0.421
H and S concerns	0.265	0.444	0.181	0.404	0.478	0.510

Notes: In Correlation row Spearman's Ro correlation coefficient is reported together with Prob (level of significance) for the test of the Ho of independence; for all three pairs Ho is rejected. Detailed definitions of variables used in the segment characteristic panels can be found in the questionnaire, Supplementary Materials and in the text.

The upper panel of Table 2 shows the segment structure before and after the COVID-19 pandemic began. The Spearman's rank coefficient calculated for the pair of segment structures demonstrates that there is no statistically significant change in consumer attitudes because the null hypothesis (Ho) of independence is rejected at Prob > 0.001. In the analysis that follows, we use the pre-COVID-19 segmentation, which is more likely to represent the equilibrium, long-term structure of consumer attitudes.

The middle panel of Table 2 provides summary statistics of a range of demographic variables describing consumer characteristics. It is notable that the three, consumer segments, generally, appear quite different from each other in terms of demographics as required. In terms of important basic characteristics, the segment (A) of sourcing food

by cooking at home, relative to the segment (B) of sourcing meals outside the home, is represented by older, female consumers who are married and have small children.

The bottom panel of Table 2 presents summary statistics of three additional variables that are theoretically motivated and used in the following regression analysis. First, the price that consumers face also represents the willingness to pay. Following relevant studies (e.g., [87]), price is calculated as a weighted average for each consumer using their access to food pattern. The price offers a clear ranking of consumer segments with segment (C) showing the highest willingness to pay. The financial constraint variable measures the consumer responses about their constraint in purchasing food, with consumers from segment (C) being the least constraint. The health and safety (H and S) concerns of consumers are captured by a dummy variable which takes a value of one if the consumer reports that their consumption decisions are affected by H and S concerns since COVID-19, and zero otherwise. It is interesting to point out that consumers who source meals in a mixed mode (segment (C))—both by cooking at home and purchasing ready meals outside the home—appear most H and S concerned, while consumers from the segment (B) who source meals from outside the home are the least H and S concerned.

4.2. Regression Analysis

Table 3 reports the results from the latent class model (LCM) estimation using multinomial logit, which corresponds to Equation (1)–(3) in the previous section. An important issue in the empirical application of the model is the number of segments to be used in the analysis. Using the Bayesian information criterion (BIC), the preliminary formulated—on the grounds of exhausting of plausible alternatives—three-segment structure was tested against two alternatives. The first was a two-segment structure where the mixed mode of sourcing meals (C) was merged with the sourcing meals outside the home mode (B) and, the second was a four-segment structure where the mixed mode (C) was split into two sub-categories—one with more cooking at home and the other with more sourcing from outside the home. Based on the BIC values, we found that the LCM with three consumer segments was the optimal specification as the BIC value was appropriately minimised; the four-segment structure did not show any significant improvement in the BIC value.

In the estimation discussed below, the mixed segment (C) is set as the base category with no further normalisation with respect to the parameters. In the four specifications (Model 1–4) considered, the values of the McFadden's R^2 are above 0.38, indicating a good model fit.

In general, across the four estimated models, we found that the demographic variables with significant impact were age, gender, and household composition, specifically the presence of young children under the age of 8 years. Consumers from segment (A) are older relative to the base category, segment (C), and also relative to segment (B). Consumers from segment (B) are predominantly men, and in their households, they do not have small children. The rest of the demographic variables considered did not show a statistically significant impact in any consumer segment.

Concerning the access-to-food options, in the base Mode 1, consumers from segment (A) strongly preferred the cooking at home mode of accessing food; the effect of eating out in restaurant mode is statistically negative. Consumers from segment (B) strongly prefer both eating out in restaurants and ordering takeaways. Price, as expected, has a negative and significant impact on consumers of both segments (A) and (B) as the price sensitivity appears higher for consumers of segment (B).

Table 3. Multinomial logit model regression estimates.

Variable	Model 1		Model 2		Model 3		Model 4	
	Segment (A)	**Segment (B)**	**Segment (A)**	**Segment (B)**	**Segment (A)**	**Segment (B)**	**Segment (A)**	**Segment (B)**
Age	0.807 ** (0.341)	0.701 (0.532)	0.821 ** (0.349)	0.254 (0.625)	0.758 ** (0.347)	0.447 (0.578)	0.792 ** (0.354)	0.190 (0.692)
Gender (female)	0.873 (0.592)	−1.933 * (1.150)	0.929 (0.603)	−2.303 * (1.406)	0.836 (0.598)	−2.377 * (1.347)	0.894 (0.607)	−2.911 * (1.729)
Children below 8 y	0.271 (0.583)	−4.526 ** (1.841)	0.237 (0.595)	−4.294 ** (1.721)	0.240 (0.593)	−6.833 ** (2.773)	0.192 (0.605)	−6.449 ** (2.916)
Eating in restaurants	−0.858 * (0.505)	1.277 * (0.788)	−0.806 (0.523)	1.651 * (0.994)	−0.735 (0.530)	2.279 ** (1.078)	−0.748 (0.542)	2.404 ** (1.205)
Ordering takeaways	−0.008 (0.444)	1.116 * (0.661)	−0.074 (0.452)	1.021 (0.673)	−0.089 (0.460)	0.929 (0.700)	−0.011 (0.469)	0.860 (0.713)
Cooking at home	1.240 ** (0.373)	−0.954 (0.681)	1.296 ** (0.388)	−1.456 * (0.868)	1.219 ** (0.384)	−2.034 * (1.118)	1.248 ** (0.393)	−2.634 * (1.484)
Price	−0.860 ** (0.362)	−0.978 * (0.592)	−0.913 ** (0.371)	−1.468 * (0.816)	−0.840 ** (0.382)	-0.880 (0.678)	−0.828 ** (0.380)	−1.030 (0.861)
Financial constraint	-	-	−0.351 (0.660)	−3.323 ** (1.673)	-	-	−0.225 (0.679)	−3.200 * (1.917)
H and S concerns	-	-	-	-	−0.533 (0.605)	−3.656 ** (1.848)	−0.504 (0.622)	−3.709 * (2.300)
Constant	−3.590 (2.667)	−0.382 (3.683)	−3.927 (2.778)	2.812 (4.475)	−3.174 (2.791)	4.047 (4.816)	−3.676 (2.859)	7.606 (6.174)
No of observations	117		117		117		117	
Pseudo R^2	0.379		0.410		0.412		0.434	

Notes: Estimated coefficients and (standard errors) are reported; * denoted 10% level of significance; ** denotes 5% level of significance.

In Model 2, where we add a variable measuring financial constraints, the impact of cooking in home mode on utility remains the same as in Model 1 for consumers from segment (A). For consumers from segment (B), however, only the impact of eating out in restaurant mode remains significant, as at the same time, the negative impact of cooking at home becomes statistically significant. The impact of financial constraint is significant negative only on consumers from segment (B). It seems that once the impact of the financial constraint is controlled for, consumers from segment (B) shift to eating out in restaurants mode from the ordering takeaways mode.

In Model 3 the effect of health and safety (H and S) concerns, explicitly associated with COVID-19 is added to the base Model 1. This modification does not change the behaviour of consumers from segment (A), however, there are some interesting changes in the behaviour of consumers from segment (B). First, the impact of the H and S concerns is statistically significant, negative on consumers from the segment (B). Further, there is a big change in the effect of the price variable for segment (B), which turned out to be statistically insignificant. Finally, the positive impact on utility of segment (B) from eating out in restaurant mode increased. These effects taken together suggest that consumers from segment (B) who prefer sourcing meals from outside the home are quite responsive to H and S concerns and in circumstances, such as COVID-19, the price becomes a less important factor. These consumers also seem to switch from ordering takeaways to eating out in restaurants mode, which they consider a safer option.

In Model 4, both variables—financial constraints and H and S concerns—are included. The effects represent a combined picture of Models 2 and 3, but the effect magnitudes are quite similar to the ones in Model 3. This suggests that both COVID-19 specific shocks—financial constraint and H and S concerns—are important, with perhaps the H and S concerns having slightly higher significance.

4.3. Attitude Factors Affecting the Access-to-Food Modes

As established in the previous section, the access-to-food modes had a significant impact on the intrinsic utility of consumers conditional on their segmentation by attitude type. In this section, the aim is to explore the factors affecting attitudes towards different access-to-food modes. Based on survey data, we identified the most important factors affecting consumer access-to-food attitudes. The information is reported in Table 4.

Starting with the eating out in restaurants mode (Panel A of Table 4), pre-COVID-19, the most important attitude factor, by far, is consumer's own experience. Thus, we can argue that eating out in restaurants is associated with experientially motivated attitudes. To some degree, also important are marketing factors such as "Peer, targeted recommendations". The findings suggest stability of consumer attitudes.

Next, we consider the ordering takeaways mode with the main factors, pre-COVID-19 depicted in Panel A of Table 4. Again, the most important factors are associated with consumer's own experience, both in terms of easy access and value of the food. In the context of this mode, it seems that marketing factors such as targeted recommendations and wider advertising are of lesser significance.

The third access-to-food mode—cooking at home—represents the most popular way consumers source meals. This is perhaps the most common and natural way of accessing food for large majority of consumers but not for all as this can be seen in Panel A of Table 4. As previously discussed, and established by the survey data, there are generally, two types of consumers, some that like cooking and others who do not. The most important factors positively affecting attitudes to cooking at home are the interest in healthy diet and eating food that fits well the consumer's taste. Also important are factors such as enjoying cooking and saving money. The factors having most significant negative effect on the attitudes to home cooking are of a more pragmatic type—poor cooking skills and limited time, as well as not enjoying cooking.

Table 4. Attitude factors.

Attitude Aspects	Factors	Share, %
	Panel A	
Attitude factors influencing eating out in restaurants	**My own experience**	**64.66**
	Peer, targeted recommendations	**17.24**
	Advertisements and marketing campaigns	12.07
	Observing others' behaviours	6.03
Attitude factors influencing ordering takeaways	**My own experience (value of the food)**	**46.36**
	My own experience (easy access)	**33.64**
	Peer, targeted recommendations	7.27
	Advertisements and marketing campaigns	7.27
	Observing others' behaviours	5.45
Attitude factors (positive) of cooking at home	**Healthy eating**	**29.20**
	Personalized taste	**21.68**
	Enjoy cooking	21.24
	Saving money	18.58
	Convenience	5.31
	Enjoy following online recipes	2.65
	Saving time	1.33
Attitude factors (negative) of cooking at home	**Poor cooking skills**	**35.14**
	Limited time	**35.14**
	Hate cooking	24.32
	Easy to use online food platforms	5.40
	Saving money unimportant	0
	Not interested in healthy eating	0
	Panel B	
Attitude factors of accessing food since COVID-19	**My own (past) experience**	**57.02**
	My own (current) H & S concerns of accessing food	**30.70**
	Observing others' behaviours	4.39
	Advertisements and marketing campaigns	4.39
	Peer, targeted recommendations	3.51
	Panel C	
Medias of food platform advertising	**General Internet or TV advertisements**	**27.5**
	Facebook	**20.0**
	YouTube	19.0
	Promotional Email advertisements	16.0
	Instagram	10.0
	TikTok	4.0
	Twitter	3.5
	Pinterest	0

Notes: Shares based on 117 responses. The top-2 factors for each attitude aspect are indicated in bold.

Finally, a set of attitude factors that affect access to food during COVID-19 are presented in Panel B of Table 4. Generally, the factors considered are most relevant to attitudes

to sourcing meals from outside the home but by implication the factors are also relevant to attitudes to sourcing meals by cooking at home as the two options/segments are alternatives. As established by the analysis in previous sections the attitudes to sourcing meals remain quite stable since the COVID-19 pandemic began. Therefore, it is not surprising the main factors most significantly affecting attitudes to food access are consumer's own experiences, both past and current. Importantly, the current experiences are primarily associated with H & S concerns. Interestingly, advertisements and marketing campaigns represent the third most significant attitude factor during COVID-19. This suggests that while accessing food is a strongly experiential, consumers are also open to marketing interventions and learning, especially in the face of unconventional circumstances such as COVID-19.

Panel C of Table 4 shows a breakdown of the popular advertising sources where food platform (e.g., Just Eat, Deliveroo, Uber Eat) advertisements are placed. Even though traditional advertising channels—Internet and TV as well as promotional Email—are important, more than 50% of the consumers also report a Social Media platform—with Facebook and You Tube being the most popular—as a channel through which they are influenced in their food access choices.

5. Discussion

To guide the study, three specific research questions (RQ) were formulated. The main findings associated with each RQ are summarised next.

RQ1: Are there any changes in preferences and attitudes to meal sourcing during COVID-19 compared to the pre-COVID-19 situation?

Three consumer segments were identified—sourcing meals prepared by cooking at home (A), sourcing meals prepared by others outside the home (B), and sourcing meals by mixing cooking at home and food prepared outside home which represents a mixed meal sourcing segment (C). Based on analysis of survey data, we find that even though there are some observed changes in food-sourcing patterns, consumer preferences and attitudes, underlying the market segmentation have not changed in statistically significant way. This finding is in line with Fanelli [3] who also finds that eating habits and food-related behaviour during the COVID-19 pandemic have not changed. However, Fanelli [3] finds some evidence of changes in the access to food; people have been spending more time eating at home. Next, we identify some important factors affecting consumer attitudes to meal sourcing during the COVID-19 pandemic which are of relevance to business and marketing.

RQ2: What are the main factors affecting the consumer attitudes to accessing food and sourcing meals, in general, and during COVID-19?

In general, the demographic characteristics of consumers are important, with age, gender, and household composition, specifically the presence of young children of age below 8 years having the most significant impact. Consumers from segment (A) are older relative to segment (B) and to the base category, segment (C). Consumers from segment (B) are predominantly men and in their households, they do not have small children. Our findings are in accord with Ben Hassen et al. [6] who find that gender, age, and education have very significant effects on consumer behaviours. Younger men use more delivery applications, order take-away or fast-food meals, while women (especially better educated ones) are more likely to prepare food at home and spend more of their time cooking.

Two COVID-19 specific shocks—financial constraint and health and safety (H & S) concerns—are found important with the H & S concerns having a higher significance. Similarly, Cranfield [1] finds that consumers stockpile food to reduce their perceived risk of exposure to COVID-19 when visiting shops. Fanelli [3] finds in an Italian survey on COVID-19 and food safety issues that 70% of respondents declare food safety an important concern for them during the COVID-19 pandemic.

Finally, as expected, the access-to-food mode has a significant impact on the intrinsic utility and attitudes in the consumer segments. For segment (A) most important is as

expected cooking at home while for segment (B) eating out in restaurants and ordering takeaways are main options. This finding is also a confirmation of the relevance of the market segmentation in this study.

RQ3: What are the implications of COVID-19 for business and marketing in the food and hospitality industries?

Answers to this RQ have been provided (indirectly) throughout the results section. Here explicit implications for business and marketing are formulated. Most importantly, the study finds that consumer attitudes are stable and have not significantly changed during COVID-19. This is important for understanding consumer behaviour concerning food-access modes. We find that eating out in restaurants is based on experientially motivated attitudes. Therefore, marketing initiatives in the restaurant sector must focus on improving consumer experience. Traditional marketing approaches such as "Peer, targeted recommendations" and "Advertisements and marketing campaigns" could still be relevant as far as these manage to affect positively consumer experience attitudes.

In comparison, for ordering takeaways most important factors are associated with more utilitarian consumer attitudes, in terms of easy access and value of the food. In the context of this food-access mode, marketing approaches such as targeted recommendations and wider advertising are reported by consumers to be of lesser importance. This situation appears representative of what is known as the paradox of participation: the less important the product is to consumers, the more important are marketing incentives such as packaging, slogans, and toys designed to sell the product.

Considering the two main types of consumers, ones that like cooking and others that do not, the most important factors positively affecting attitudes to cooking at home are the consumers' interest in healthy diet and eating food that fits well their taste. This opens several opportunities for marketing communication to consumers by food retail industry. Specifically, promoting products associated with healthy meal preparation. Besides, promoting food products fitting the diverse tastes of the increasingly diverse consumer population in the UK could be a promising avenue of business and marketing activities.

6. Conclusions and Limitations

The aim of this study is to identify the antecedents and develop an understanding of the behaviour of consumers in sourcing meals and the manifestation of different behavioural patterns before and during the COVID-19 pandemic. To achieve the aim, this study drew from theories of social psychology, economics, and food security as a background for understanding the factors and processes affecting consumer attitudes. The study is positivist and employs mixed methods. Thus, the materials and methods of the study include a questionnaire as a survey instrument and corresponding LCM estimation methodology for the data analysis.

The results suggest that attitudes toward sourcing meals have remained quite stable since the COVID-19 pandemic began. Contemporary consumer experiences are primarily associated with health and safety concerns, conditional on financial affordability. Nevertheless, advertisements and marketing campaigns remained an important factor during the COVID-19 pandemic. Social media platforms have grown in importance as a channel through which consumers can be reached for their food access behaviours.

Even though the findings of our study are consistent in several ways with the literature reviewed in Section 2, the study has some limitations which should be kept in mind when utilizing our results. First, the number of observations in our survey is relatively small, which may have an impact on the representativeness of the data. Second, the survey was conducted online, which may again impact on the representativeness of the data because illiterate (vulnerable) people and those without access to technology may be underrepresented. These limitations, however, are not unusual for surveys, conducted during the COVID-19 pandemic. Considering the extraordinary crisis context, it has been a case of trading off a timely collection of data, amidst the pandemic with a collection of large, representative samples that takes more time and resources.

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