

Food Preferences during COVID-19 Lockdown

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Changes in consumers' total food consumption reflect individual food preference during the COVID-19 lockdown. In addition, changes in consumers' food expenditure represent consumers' behavioral preference. Furthermore, trends in shopping behaviors towards food products with sustainable attributes also reflect food preferences during the lockdown.

Keywords: COVID-19 lockdown ; food preferences ; risk preference ; risk perceptions ; food purchasing behavior ; food consumption behavior ; sustainable behavior

1. Overview

The COVID-19 pandemic poses a threat to global food security, and it changes consumers' food buying and consumption behavior. This research not only investigates trends in Spanish consumers' general food shopping and consumption habits during the lockdown, but also investigates these trends from the perspective of sustainable purchasing. Specifically, total food consumption (C), food expenditure (E), and purchase of food with sustainable attributes (S) were measured. Data were collected from a semi-structured questionnaire which was distributed online among 1203 participants. The logit models showed that gender, age, employment status, and consumers' experiences were associated with total food consumption and expenditure during the lockdown. In addition, consumers' risk perceptions, shopping places, trust level in information sources, and risk preference were highly essential factors influencing consumers' preferences and sustainable behavior. Consumers' objective knowledge regarding COVID-19 was related to expenditure. Furthermore, family structure only affected expenditure, while income and place of residence influenced food consumption. Mood was associated with expenditure and the purchase of sustainable food. Household size affected purchasing behavior towards food with sustainable attributes.

2. Introduction

Novel coronavirus disease, named "COVID-19" by the World Health Organization (WHO), was initially reported in the city of Wuhan, China in December 2019 ^[1]. Subsequently, it began rapidly spreading around the world, resulting in a global pandemic. Spain took many preventive measures, including lockdowns, stay-at-home orders, mass quarantine, and transportation halts when COVID-19 started to spread in Spain. The Spanish government declared a state of emergency on 14 March 2020 and increased the severity of the state of alarm from 30 March to 14 April 2020, which was a strict lockdown period. People could only leave home when they were working in essential services (health, security, social, and economic wellbeing of citizens) or when they needed to buy necessary products (groceries and medicine) during the lockdown ^[2]. The COVID-19 pandemic situation not only affected human health, but also caused several economic and social changes. On the one hand, the rate of unemployment increased and financial strain became more severe ^[3], which led to an increase in depression risk, stress, and feelings of helplessness ^[4]. On the other hand, the COVID-19 pandemic created new working and family situations (e.g., teleworking, e-learning, homes with narrow space, and living space without direct access to sunlight), which also induced stress and depression ^[5].

In this context, a significant share of consumers increased their food consumption due to higher anxiety levels ^[6]. A previous study showed that consumers in ten European countries consumed more food as a result of the COVID-19 lockdowns across Europe and an increase in homeworking that led people to spend more time at home, influencing their consumption behavior and food choices ^[7]. Another study reported that almost half of the respondents stated that they increased food consumption during the lockdown in Italy, with twenty percent of them gaining weight ^[8]. On the contrary, compared to the period before the COVID-19 outbreak, Polish youth had a better dietary intake during the outbreak, as the pandemic changed the determinants of food choices, reinforcing the importance of health and weight control ^[9]. The Italian lockdown allowed consumers to make positive habits towards food consumption ^[9]. In addition, the COVID-19 outbreak led Spanish consumers to adopt a healthier eating habit/behavior, as evidenced by a higher level of adherence to the Mediterranean diet (MedDiet) ^[10].

Additionally, the COVID-19 lockdown also changed consumers' shopping behavior. Individuals focused on buying food items as a behavioral reaction to feelings of stress and uncertainty ^[11]. Negative feelings (e.g., fear, stress, and uncertainty) could cause a panic buying situation ^{[12][13]}. Panic buying behavior exacerbates stock-out situations and often leads to a price increase in food products ^[12]. Spanish consumers were shown to be stockpiling non-perishable food and other supplies during the COVID-19 lockdown ^[14]. Some people stockpiled food items and bought more on each trip to minimize store visits, aiming to reduce the risk of infection ^[15]. According to previous research, 64% of consumers experienced product shortages at stores from which they were attempting to purchase, and 50% of consumers stocked up on products to avoid deficiencies in the future during the COVID-19 outbreak in India ^[16]. Additionally, consumers' food spending increased dramatically during the COVID-19 outbreak ^{[17][18]}, and another report indicated that grocery spending increased in Spain due to COVID-19 ^[19]. Furthermore, the COVID-19 pandemic enabled people to turn to purchasing food products online in an attempt to limit their perceived risk of exposure to infection ^[20]. Moreover, a previous study indicated that consumers turned to purchasing organic food or buying food products directly from farmers ^[21].

In addition, consumers' shifts to more sustainable behavior can dramatically reduce their carbon impact ^[22], which contributes to the achievement of sustainable development in Spain. There is considerable literature that has explored consumers' attitudes, purchasing, and consumption behavior towards food products with sustainable attributes (e.g., organic food, animal welfare food, fair-trade food, environmentally friendly food, and local food) before the COVID-19 lockdown ^{[23][24][25][26]}. However, little research attempted to measure them during the lockdown, and it is of great importance and necessity to conduct such a study that ensures the availability of sustainable food in the market during the pandemic. To date, few studies have explored how COVID-19 affected Spanish consumers' purchasing or consumption behavior ^{[2][27]}, and these studies focused on the evolution of people's information searches or only on food consumption/dietary behavior. Evidence on trends in expenditure and purchases of food with sustainable attributes during the Spanish lockdown and their related determinants is insufficient. This research includes more comprehensive potential impact factors and, to our knowledge, is the first study that not only investigates trends in Spanish consumers' general food buying and consumption behavior during the lockdown, but also investigates these trends from the perspective of sustainable purchasing. In this context, the main objective of this study is to analyze trends in consumers' food preferences and sustainable behavior during the COVID-19 lockdown.

3. Changes in Total Food Consumption (C) during the Lockdown

The OR of gender was equal to 1.394, meaning that females were 1.394 times more likely to increase food consumption than males during the lockdown. One possible reason was that many food-away-from-home establishments were closed because of the shutdown restrictions during COVID-19 in Spain, such that an increasing number of working women had to cook at home, where they tended to consume more food. Another reason may be that women were more prone to depression, stress, and anxiety than men, resulting in more emotional eating ^[28]. People aged 40–59 years and more than 60 years old were less likely to increase total food consumption than those aged 18–39 years when compared to the situation before the lockdown. This is in line with a study which showed that older people consumed less than younger people during the COVID-19 lockdown ^[29]. The results also demonstrated a positive and significant association between income and total food consumption. This indicated that households whose monthly income before the lockdown was more than 3000 euros were 2.963 times more likely to increase total food consumption than those less than 999 euros. Not surprisingly, more income in a household denoted a stronger purchasing power to provide food for their family members, such that they were more likely to increase total food consumption during the COVID-19 lockdown. People whose current employment status was ERTE (partial or total), on sick leave, unemployed, or unable to work were less likely to increase their food consumption during the lockdown. It was expected that these people's jobs were suspended or they were unable to work, such that their sources of income were cut off by COVID-19, and they were less likely to increase their consumption level. However, there was little change in income (no income) for students before and during the lockdown. Results also indicated that people who live in rural places were less likely to consume more food than those living in urban places. This may be related to several reasons. Firstly, population flow is more frequent in urban areas than that in rural places, resulting in a higher risk of contracting COVID-19 for consumers who live in urban areas. Consequently, people living in urban places may feel worried, anxious, or negative about themselves; thus, they tended to display emotional eating behavior to avoid these negative feelings by turning their attention to food during the lockdown ^[30]. Secondly, consumers living in urban areas usually have a higher income than those living in rural places; that is, they have a stronger purchasing power and consumption power.

As for consumers' stated risk preference, the results showed that risk-averse people were less likely to increase their total food consumption than risk-loving persons. A previous study indicated that risk-averse respondents may seek out more insurance after a disaster ^[31]; thus, risk-averse people may focus on health insurance or save money to make themselves

feel more secure and use it when there is a health threat in the future. Respondents who did not experience food shortages or higher food prices or did not know someone who had been diagnosed or died due to COVID-19 were less likely to consume more food than those who experienced these situations. This could be explained by the fact that subjects who experienced food shortages or higher food prices or knew someone who had been diagnosed or died due to COVID-19 were more likely to be anxious ^[32]; thus, they were prone to emotional eating (over-eating). Regarding shopping places, people who went to specialized food stores and farmers' markets to purchase food before the lockdown were less likely to consume more food than those who went to supermarkets. This may be because specialized food stores and farmers' markets only sell food, while supermarkets have a wider variety of not only food products but also other necessities, such as toilet paper, shampoo, and pet supplies. Therefore, in order to reduce the number of visits to stores and reduce the risk of infection, consumers who used to buy food from specialized food stores and farmers' markets may have preferred to buy food from supermarkets during the lockdown, such that those who went to supermarkets consumed more food.

Results also showed that consumers were less likely to increase their food consumption when they perceived a higher trust level in health professionals (e.g., doctors) during the lockdown. Trust in reliable scientific information contributes to reducing unnecessary scares and inappropriate risk perceptions ^[33]. Hence, consumers who trust health professionals could reduce their risk perception and were less likely to panic buy and consume food. Regarding risk perception of COVID-19, this category demonstrated that consumers who perceived a higher risk of COVID-19 were more likely to increase their total food consumption than those who perceived a lower risk during the lockdown. This may be because if consumers thought the situation was serious, they were worried about themselves and tended to display emotional eating behavior. As for food security risk perception, this category revealed that consumers who perceived a higher risk of food shortages in the next six months were more likely to increase total food consumption than those perceiving the lowest food security risk. It was not surprising that people with a higher food security risk perception tended to stockpile food products to reduce the food security risk; thus, they turned to increase food consumption.

4. Changes in Total Food Expenditure (E) during the Lockdown

The results demonstrated that females were less likely to spend more on food than males during the lockdown. The data from the National Statistics Institute in Spain showed that the unemployment rates of females and males in the first quarter of 2020 in Spain were 16.24% and 12.79%, respectively. In the second quarter, they stood at 16.72% (females) and 14.13% (males) ^[34], indicating that females had a higher likelihood of being unemployed than males during the lockdown. Hence, females were more cautious about their income and less likely to increase food expenditure. Another potential reason was that females were the main meal preparers and "food gatekeepers" in the household ^[35]. As a result, they were more familiar with the characteristics (e.g., the price and the quality) of food products and always knew what food to buy, such that females were less likely to increase food expenditure. Conversely, males were not usual food buyers and not familiar with food products; therefore, males may have increased their expenditure on food.

People aged 40–59 years and more than 60 years old were less likely to increase expenditure than those aged 18–39 years when compared with the situation before the lockdown. The elderly were at a high risk of death due to COVID-19, which may have increased their worry and further affected their appetite ^[36]. Therefore, their cost was not likely to increase compared to younger people during the COVID-19 lockdown. Results also indicated that respondents whose employment status was sick leave and unable to work were less likely to spend more on food during the lockdown, which may be related to the interruption of their income. In addition, households with children aged 7–12 years were 2.218 times more likely to increase food expenditure than those without children. It was expected that primary schools were closed during the lockdown, such that children aged 7–12 years had to stay at home, resulting in more expenditure. Participants who experienced food shortages during the COVID-19 lockdown were 1.688 times more likely to increase their food expenditure than those who did not face food shortages. If consumers had experienced food shortages, they were likely to perceive that future food supplies may also be limited. Therefore, they spent more and stockpiled more food to reduce food security risks. In addition, consumers who tested positive or knew someone who had been diagnosed or died due to COVID-19 were more likely to increase food expenditure. This may be attributed to the fact that these people perceived a higher risk of contracting COVID-19. They therefore tended to buy more food per visit and reduce the number of shopping trips, thus reducing the risk of infection and consequently spending more on food. As for shopping places, consumers who bought food on retailers' websites during the lockdown were 4.574 times more likely to spend more on food than those who bought food in supermarkets. This is consistent with a study which found a significant increase in online shopping due to COVID-19 ^[7]. It was expected that consumers tended to shop online rather than in supermarkets to minimize store visits, aiming to reduce the risk of infection.

In addition, our results demonstrated that consumers with a positive mood (reassured) were more likely to increase food expenditure, while those with a negative mood (angry) were less likely. This outcome is supported by Mehrabian and Riccioni, who concluded that a positive mood was associated with high appetite levels [37]. Therefore, people with a positive mood during the lockdown tended to purchase more food and increase food expenditure, while a negative mood decreased consumers' appetite; thus, they were less likely to increase food expenditure. With regard to risk preference, the results implied that risk-neutral and risk-averse people were less likely to increase their food expenditure than those who were risk-loving during the lockdown. This may be related to risk-averse people's aversion to uncertainty, i.e., risk-averse consumers prefer certainty to uncertainty more than risk-loving ones. Due to the COVID-19 outbreak, they may tend to reduce food expenditure and save more money to prevent insufficient money when uncontrollable situations arise in the future. The findings also revealed that consumers were less likely to spend more on food when they perceived a greater trust in government and news information regarding COVID-19 during the lockdown. This is supported by a study which demonstrated that higher trust in the national government had positive effects, such as reducing the likelihood of respondents' fears and worry of food shortages [38]. Consequently, these consumers perceived a lower food security risk and were less likely to stock up on food and increase food expenditure.

As for consumers' risk perceptions, the results indicated that the higher the COVID-19 risk and food security risk the consumers perceived, the more expenditure was seen. This is in line with a study which showed that consumers tend to purchase more stock goods when they perceive a higher risk, and this also indicates that a high risk perception during the COVID-19 pandemic will cause the intention to buy goods, leading to a higher probability of increasing food expenditure [39]. Another study also demonstrated that risk perception of the COVID-19 pandemic has positively affected consumers' behavior regarding the tendency to maintain food stocks [40]. The results also showed that consumers would not increase food expenditure when they perceived a higher financial risk, which highlighted previous research showing that risk perception negatively affected attitude and purchasing behavior [41]. This was expected, because when consumers feel threatened about their current financial situation, that is, perceiving a higher financial risk, they are more cautious about spending money. Additionally, consumers with a higher objective knowledge level regarding COVID-19 were found to have a higher likelihood of increasing food expenditure. It was expected that the more knowledge consumers had, the more severity about COVID-19 they perceived, such that they were more likely to increase expenditure to stock up on food.

5. Changes in Purchasing Food with Sustainable Attributes (S) during the Lockdown

The result showed that households with 5 members were 2.551 times more likely to purchase more food with sustainable attributes than those with 1 member when compared with the situation before the lockdown. This is supported by a study which indicated that consumers living in larger households were more likely to purchase organic food products [23]. In addition, risk-averse consumers were less likely to increase their purchases of food with sustainable attributes during the lockdown. This outcome converges with the finding that risk-averse respondents avoided buying more sustainable food during the lockdown in China [42]. It may relate to the uncertainty consumers feel when uncertain about food with sustainable attributes (e.g., whether organic certification can be trusted); they may therefore prefer the certainty of conventional products to the uncertainty that may come from sustainable ones [43]. The results also indicated that people who used to purchase food from specialized food stores (before the lockdown) were less likely to buy more food with sustainable attributes than those who usually went to supermarkets. Similar to the previous explanation, one possible reason was that specialized food stores only have food, while supermarkets have a more complete variety (e.g., food, alcohol, toilet paper, and pet supplies). As a consequence, consumers who used to purchase food from specialized food stores may be inclined to buy food (including food with sustainable attributes) and other necessities from the supermarkets during the lockdown to minimize trips to the store and reduce the risk of infection. Additionally, consumers with a positive mood (reassured) were more likely to purchase more food with sustainable attributes while those with a negative mood (angry) were less likely. One possible explanation was that positive emotions make consumers perceive sustainable food (e.g., organic food) as more attractive, and they are eager to purchase and consume healthy food [44].

According to the results, consumers with a higher trust level in government were more likely to increase their purchasing of food with sustainable attributes. This is supported by a study indicating that in public health emergencies, people who have high trust in government health agencies were more likely to follow health recommendations (including food choice recommendations) made by the government [45], and they regard sustainable food (e.g., organic food) as healthier food. Thus, they are more likely to purchase more food with sustainable attributes. The results also implied that consumers with higher risk perceptions of COVID-19 and food security were more likely to buy more food with sustainable attributes. Similarly, consumers in Spain perceived these products were healthier than conventional ones [46], which contributes to improving their immunity and reducing the risk of infection. The results also demonstrated that respondents who perceived a higher financial risk were less likely to purchase more food products with sustainable attributes when compared with the

situation before the lockdown. Not surprisingly, food products with sustainable attributes were more expensive than conventional food [42]. Consumers tended to buy less sustainable food (expensive) when they perceived a higher financial risk, and they would spend money more carefully during the COVID-19 pandemic. The results of food security risk perception and financial risk perception are similar to the previous research conducted in China [42], but we did not find the effects of gender and age on the purchases of food with sustainable attributes in this research.

6. Practical Implications

Firstly, based on the result of the increased expenditure on the retailers' websites, retailers should design a more visually attractive and convenient website, taking advantage of this opportunity to retain customers. Secondly, the Spanish government should make efforts to design more effective information to communicate with people and should enhance the quality and level of detail of the information that they share in such an emergency. This is because consumers reported low trust in government and news while reporting high trust in health professions and scientists, inspiring health professions and scientists to share more reliable and trustworthy information about COVID-19 and recommendations of food choices and consumption. Thirdly, households with children aged 7–12 years were more likely to increase food expenditure. As a result, retailers could carry out promotion activities (e.g., children's related food can be given as a gift if consumers spend a certain amount of money in the store), so as to attract families with children. Finally, consumers who live with large households and those who often go to the supermarket to buy food were more likely to purchase more food with sustainable attributes, reminding retailers to focus on these people by using this argument to first place and highlight sustainable items (e.g., organic items) in hotlines on the shelves.

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