PARENTS' PREFERENCES FOR A PLANT-BASED GAME FOR SHIFTING TO SUSTAINABLE HEALTHY DIETS

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Abstract

Some of the major issues of this century are environmental damage, availability of resources and health concerns, especially, obesity. Food production and the current model of food consumption contribute to make these issues bigger. From this perspective consumers can make the difference depending on their eating behavior and their consciousness to minimize food waste. One way to make children more aware of environment and induce them to eat healthier food in the future might be the introduction of educational games made by food waste through which they learn by playing the importance of the environment and the impact of their health of food they eat. In this study we investigated the parent's behavior and how much they are willing to pay for a kind of food products with educational and eating scope.The study took place in Spain. The sample was set at 300 individuals randomly stratified by sex, age and province and the target sample were parents of children aged 4 to 12 and a hypothetical choice experiment was used to estimate parent´s preferences for different alternative of game food product. The results indicate that the behavior showed by these parents are in line with the European strategy "From farm to fork" where it is recommended moving to a more plant-based diet in order to reduce life-threatening diseases, and also environmental impact of the food system. In our investigation consumers are willing to pay more for the product with a storybook related to healthy eating habits or recyling better than no storybook.

Keywords: Healthy diet for children, Food waste, Feeding style, Educational games, Eating habits

1. Introduction

Northern food consumption patterns are affecting negatively our health and the impact that humans have on the environment. When consumers make decisions on what to eat or where to buy are contributing to improve or make this situation worse. Being conscious of their waste and behavior, consumers may change this trend to certain extent. Children internalize rules and adopt them as their own around the age of nine and ten [Ogden and Roy-Stanley, (2019)]. Factors such as characters of parents, household income, physical activity [Qiu and Hou, (2020)] and feeding style of parents [Vollmer, (2019)] have been associated with children's eating behaviors. Controlling the child's environment by providing healthy foods can contribute to develop children preferences for fruit and vegetables due to familiarity [Boots, et al., (2019)]. Game-based actions such as cooking [Nicklaus and Schwartz, (2019)], or the repeated exposure of children to vegetables through picture books [Owen et al., (2018)] have demonstrate to have a positive influence on foods familiarization and vegetables liking. We present a case study of a game food product that intend to show children the importance of a healthy diet and the care for the environment. The objectives of the present work were to analyze the willingness to pay for this plant-based product with educational and eating scope and charaterize parent's behavior related to their feeding styles.

2. Materials and methods

Research method was hypothetical choice experiment and survey of individuals' characteristics. Data was collected through random stratification by sex, age and province. Sample consisted of 300 parents of children aged 4 to 12.

2.1 Feeding styles

Parents feeding style [Vollmer, (2019)] influence children eating behavior and particularly, preference for vegetables. Sample was classified in four feeding styles: authoritative, authoritarian, indulgent and uninvolved following the scale and explanation in Hughes et al. (2005) and Vollmer (2019). This classification is based on the degree of demandingness and responsiveness of parents [Hughes et al., (2005)]. That means how much pressure parents put on children to eat and restrict foods and how much parents satisfy children preferences. The aim of including this factor into the investigation was to prove if parents' preferences for educational food-based products differ depending on feeding style.

2.2 Discrete choice experiment: product and attribute selection

The product used in this study to investigate parent's willingness to pay for game food products was named Fungi-pack. It consisted of a kit for cultivating mushrooms at home using residues of roasted coffee collected from cafeterias. The pack was shown to families with kids. It offered their children an educational experience while taking care of the mushrooms, watching them grow and learning that coffee can be reused as substrate. At the end of the process children can eat the mushrooms in combination with other ingredients creating a plant-based meal. Some authors [Chow et al., (2019)] reported that in game-based approaches it is important to have a narrative context. Therefore, two story books were attached to the Fungi-pack, one about healthy diet and one about recycling for the environment. In the choice experiment respondents were asked to make repeated choices between two fungi-pack products and a no-purchase alternative. The fungi-pack was described by the attributes price and story book, with three levels each, as describe in table 1.

Table 1. *Attributes and attributes levels used in the choice experiment*

Attribute	Attribute Levels	Description
Story Book	Healthy (BHealthy)	The fungi-pack includes a story book for children that explains how a healthy diet is, and which food are considered healthy.
	Recycle (BRecycle)	The fungi-pack includes a story book for children that show how to recycle and take care of the environment.
	None	The Fungi-pack doesn't include a story book.
Price (€)	5	
	7	Purchase price
	9	

Source: Elaborated by the authors

2.3 Model specification

In this study, a latent class model (LCM) was estimated using NLogit 5. The model is based on Lancaster theory where consumers maximize utility (Lancaster, 1966) and McFadden random utility (1974). Hence, consumer's preferences depend on the product attributes and it is assumed that utility (U_{nj}) is split into two components: one observed by the researcher and another unobserved (ε_{nj}) which is considered random distributed iid extreme value. In this study, observed component are the attributes describing the product and levels. Thus, the utility of an individual *n*, derived from a product alternative *j*, in a purchase situation *t*, is express as:

$$U_{njt} = \beta_0 + \beta_1 \text{BHealthy}_{njt} + \beta_2 \text{BRecycle}_{njt} + \beta_3 \text{price} + \varepsilon_{njt}$$

Where constant β_0 represents the no-buy option and ε the error term. In latent class models, individuals in the sample are assigned to classes linked to a probability of class membership. The role of specific attributes is described for each class [Hensher et al., (2015)]. Coefficients expressing the utility of attributes are fixed within a class, what means that consumers preferences are homogenous within classes and heterogeneous between classes.

Characterization of the consumers in each class was made crossing sociodemographic (gender, age, education level and income) and feeding style with class membership using chi-square statistical test, participants were assigned to the class with the highest probability of belonging (matrix CLASSP from NLogit).

3. Results

3.1 Sample characteristics

The experiment was conducted in 2020 in Spain. Sample was proportional to population in the Autonomous Regions. The participants consisted of 50% women and 50% men. The average age is 41 years. The majority of the sample has low or middle income level, <1500€/month (46.3%) or 1500-3500 €/month (43%), and secondary or university educational level (46.7% and 37.7% respectively).

3.2 Estimates from parents' preferences towards fungi-pack plant game

Table 2 presents the results from the latent class model. After testing different numbers of classes, we selected two classes. Class 1 contain 71% of the sample while class two had the 28% of the sample. Storybooks attributes were specified as dummy variables, taking a value of 1 if the storybook was presented in the Fungi-pack, or 0 otherwise. Fungi-pack without any book was considered as the reference. As expected, the PRICE attribute was negative in both classes, what means that parents' utility decrease when price increases. The NO-BUY option was also negative in both groups, which indicates that parents preferred to buy one of the Fungi-pack alternatives better than no purchase any of them. All estimated coefficients related to storybooks were positive suggesting that parents perceived more utility from fungi-packs carrying a storybook than from fungi-pack without children-book. However, there were some differences between groups. Parents in class 1 present more utility when buying the fungi-pack with the storybook about healthy foods while parents in class 2 perceived more utility from fungi-pack with recycling and environment storybook.

Table 2. *Latent class model estimates*

	Parameters	
	Class 1	Class 2
Attributes Variables	Coefficients (standard errors)	Coefficients (standard errors)
BHealthy	1.72972*** (0.09492)	0.39512** (0.19940)
BRecycle	1.44678*** (0.08851)	0.58035*** (0.20277)
No-buy	-3.37060*** (0.19063)	-2.96470*** (0.38866)
Price	-0.32588*** (0.02284)	-0.75296*** (0.06635)
Size	71%	28%
Model Statistics		
No. of observations	2700	
Log likelihood	-1983.993	
Akaike Information Criterion	3986.0	

Note: ***, **, * ==> Significance at 1%, 5%, 10% level, respectively.

Source: Elaborated by the authors

Table 3 shows the characterization of the two classes. No significant differences were found between groups when comparing their sociodemographic characteristics. However, parents in both classes presented significant differences in their feeding styles. Class1 had a higher percentage of parents with indulgent and uninvolved style, which are characterized by low level of demandingness (parents put low or any pressure on children to eat and restrict foods).Class 2 had the highest percentage of authoritative and authoritarian parents, characterized by high level of demandingness.

4. Conclusion

The results indicate that the behavior showed by these parents are in line with the European strategy "From farm to fork" where it is recommended moving to a more plant-based diet in order to reduce life-threatening diseases, and also environmental impact of the food system. In our investigation parents perceive more utility from buying one of the Fungi-pack alternatives better than no purchase any of them. Parents that apparently present a feeding style with high level of demandingness (authoritative or authoritarian) seems to perceive higher utility from fungi-pack carrying a storybook about healthy food, while parents with feeding style with low level of demandingness (indulgent or uninvolved) apparently obtain more utility from the fungi-pack with a storybook about recycling and environment. Both groups of parents showed very similar sociodemographic characteristics. Therefore, since parents seem to be interested in educate their children about plant-based diets and more environmental responsible practices these kind of game-based products with story-telling material adapted for children could be useful for marketers and policy makers when designing campaigns and targeting parents.

Table 3. *Classification of consumers based on their preferences: characterization*

Personal characteristics	Class 1 (%)	Class 2 (%)	chi-square
Gender			0.159
Women	47.4	56.5	
Men	52.6	43.5	
Age			0.642
25-34 years	24.7	29.4	
35-44 years	39.1	38.8	
45-54 years	36.3	31.8	
Education			0.977
Basic education	9.8	10.6	
Secondary	59.5	58.8	
University-master-PhD	30.7	30.6	
Income			0.931
<1500 €/month	46.9	44.9	
1500-3500 €/ month	42.3	44.9	
>3500 €/ month	10.9	10.1	
Feeding style			0.047**
Authoritative	20.9	35.3	
Authoritarian	2.8	4.7	
Indulgent	36.7	28.2	
Uninvolved	39.5	31.8	

Source: Elaborated by the authors

Note: ***, **, * ==> Significance at 1%, 5%, 10% level, respectively.

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