Food Research International 50 (2013) 361–368

Contents lists available at SciVerse ScienceDirect

Food Research International

journal homepage: www.elsevier.com/locate/foodres

Why buying functional foods? Understanding spending behaviour through structural equation modelling

E. Carrillo [a], V. Prado-Gascó [b], S. Fiszman [a], P. Varela [a,*]

[a] Instituto de Agroquímica y Tecnología de Alimentos (IATA), Consejo Superior de Investigaciones Científicas (CSIC), Avda, Agustín Escardino, 7, 46980 Paterna (Valencia), Spain
[b] Universidad de Valencia, Departamento de Psicología Social (Valencia), Spain

ARTICLE INFO

Article history:
Received 6 September 2012
Accepted 31 October 2012

Keywords:
Functional foods
Structural equation modelling
Spending behaviour
Attitudes

ABSTRACT

The market for functional foods has been growing steadily in recent years, as it is linked to a healthier diet and adds value to food products. However, more information regarding aspects that influence functional food (FF) spending behaviour is needed to gain a better understanding of what underlies FF choice and avoid product failure. The objective of this study was to build a structural equation model of Spaniards' FF spending behaviour, based on individual characteristics such as satisfaction with life, decision-making styles, gender, age and some attitudes towards food choice. This required prior validation of the functional food questionnaire for a Spanish context, which was another objective of the present work. The findings suggest that a positive attitude (reward, necessity, confidence) and novelty are good predictors of FF spending.

1. Introduction

The increasing number of functional foods (FFs) on the market reflects a trend towards innovative food marketing. It is associated with satisfying the consumers' demands and, particularly, with helping to improve their health. Functional foods have been appearing since the mid 1990s, offering not only general well-being but also specific health benefits (Menrad, 2003). Functional food has been described as a food that has been satisfactorily demonstrated to beneficially affect one or more target functions in the body beyond adequate nutritional effects in a way that is relevant to either an improved state of health and well-being and/or to a reduction of the risk of disease (Margaret, 2002). Functional foods must demonstrate their effects in amounts that can normally be expected to be consumed in the diet. However, this concept is not an official one, due to the lack of any specific legislation or recognized international definition (Krystallis, Maglaras, & Mamalis, 2008).

The various studies conducted in different countries have observed diverse attitudes towards FFs, such as a positive attitude towards certain product type/enrichment type combinations (Bech-Larsen & Grunert, 2003), a greater preference for physiology-based health benefits than for psychology/behaviour-based ones (Van Kleef, Van Trijp, & Luning, 2005), or differences according to the type of health benefit (Verhagen, Vos, Francl, Heinonen, & Van Loveren, 2010), familiarity with the ingredients added (Grunert, 2010), or gender, age, country and cultural values (Ares & Gámbaro, 2007; Siegrist, Stampfli, & Kastenholz, 2008). In addition, it is known that FF is not perceived as a homogeneous group because of being a diverse category of enriched food, however, the attitude to the global idea of this food market trend is still studied (Urala & Lähteenmäki, 2003). In particular, interest in FF is higher in Central and Northern European countries than in Mediterranean countries (Menrad, 2003). All the above factors affect the consumption of FFs.

The Spanish Ministry of Agriculture, Food and the Environment has conducted consumer studies which reveal that 30% did not know the term "functional food", but when provided with specific examples of these foods, they stated that they consumed them. Probiotic FFs were the highest-consumption category, consumed by 60% of Spaniards (Ministerio de Agricultura, Alimentación y Medio Ambiente, 2012).

The structural equation modelling (SEM) technique allows the inclusion of different variables to test for causal relations. In the present study, it was used to model theoretical relationships that contribute to an understanding of functional food spending behaviour. SEM uses latent variables (constructs), which are unobserved variables that correspond to theory-based concepts. To create these constructs, several indicators (observed variables) are taken into account (Costa-Font & Gil, 2009; Saba & Vassallo, 2002). Based on the theoretical relationships between different factors that influence FF spending behaviour, the following hypotheses were formed:

Hypothesis (HP1). Positive attitudes towards FF increase their consumption.

In the developed world eating no longer just satisfies hunger, it is also associated with a requirement for happiness and wellbeing. Eating is a social and cultural act and consumers want to experiment new sensations of pleasure and new flavours (Grunert, Dean, Raats, Nielsen, & Lumbers, 2007). In addition, consumption of an adequate diet could be influenced by satisfaction with life, which has been

* Corresponding author. Tel.: +34 963 900 022; fax: +34 963 636 301.
E-mail address: sfiszman@iata.csic.es (P. Varela).

0963-9969/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.foodres.2012.10.045

defined as "an overall assessment that the person does on his life". This definition says that people examine the tangible aspects of their lives, weighing up the good against the bad (Pavot, Diener, Randall, & Sandvik, 1991). This judgement includes evaluating one's health, wealth, friendship and romantic relationships (Diener, Emmons, Larsen, & Griffin, 1985). Based on this context, satisfaction with life has been used as an indicator of self-rated well-being. Furthermore, satisfaction with life could be related to being positive towards life and health, and tending to prevent rather than cure diseases (Muñoz-Sastre & Ferrière, 2000; Veenhoven, 2008). It means looking for better alternatives which help to prevent health problems. Given this fact, FF consumption matches satisfaction with life. Another aspect that influences positive attitudes is the perception of the specific concept of FF, which is influenced by the length of exposure to FFs and by the cultural values that are inherent to each country (Siro, Kápolna, Kápolna, & Lugasi, 2008).

Hypothesis 2 (HP2). The importance placed on the health component of food choice has a positive effect on consumers' decisions and behaviour in relation to functional food.

Health has been acquiring an important role in food consumption because nowadays consumers are interested in feeling well. Based on this interest, the market has reacted by offering foods that go beyond feeding people. In more concrete terms, it has been suggested that belief in health benefits plays an important role in FF acceptance (Lappalainen, Kearney, & Gibney, 1998; Saher, Arvola, Lindeman, & Lähteenmäki, 2004; Verbeke, 2005). Given this context, the present research studied the perceived role of health in influencing behaviour towards functional foods.

Hypothesis 3 (HP3). The importance placed on the natural component of food choice has a positive effect on consumers' decisions and behaviour in relation to functional food.

The fact that FFs require the addition of new ingredients and modern technology to achieve the promised benefits arouses distrust among consumers. In a previous study it was concluded that one of the most important factors for FF acceptance is the naturalness perceived by consumers (Urala & Lähteenmäki, 2004, 2007).

Hypothesis 4 (HP4). The consumers' novelty/fashion orientation predicts their FF consumption.

A consumer decision-making style has been defined as a mental orientation characterizing a consumer's approach to making choice (Sproles & Kendall, 1986). FFs could still be considered a novelty product and a trend in the food market for which a perfect marketing strategy has been developed by creating differentiated, value-added products and influencing attitudes towards FFs (Bakewell & Mitchell, 2004; Falguera, Aliguer, & Falguera, 2012; Grunert, 2010; Verbeke, 2005). Based on this, a hypothesis was established about how their novelty predicts functional food spending behaviour.

The objective of the present study was to model the Spaniards' functional food spending behaviour, based on individual characteristics such as satisfaction with life, decision-making styles, gender and some attitudes towards food choices (natural content and health factors). Another objective of the study was to validate the functional food questionnaire for a Spanish context in order to use it in the model.

2. Materials and methods

2.1. Participants

The sample of the study consisted on 517 university students and consumers randomly choose from different consumers' associations. The participants' age averaged 32.6, with a standard deviation of 14.1, and ranged between 18 and 76 years. They were selected according to their knowledge about FF and their consumption (question 1 of the questionnaire) for participating in the SEM model (final sample included in the model: 197, age averaged 36.49, standard deviation 14.31, ranged between 18 and 70 years) (Table 1). To model the "spending behaviour of FF", only participants that knew what functional foods were and expressed that they also consumed some functional foods, were taken into account; otherwise it would not have been possible to model this behaviour.

2.2. Application of structural equation modelling

Structural equation models (SEM) are widely used in empirical research to investigate relationships among variables, which could be measured variables (observed) or unmeasured (unobserved) variables. The last ones could be: a) the latent construct itself (generally called factors), designated as F; b) a residual associated with the measurement of each observed variable (V), designated as E and c) a residual associated with the prediction of each factor, designated as D (Fig. 1). The path diagram showed in Fig. 1 is represented by circles or ellipses that represent unobserved variables while squares or rectangles represent the observed variables Single headed arrows represent the impact of one variable over another and double-headed arrows represent covariances or correlations between a pair of variables. Bentler and Bonnet (1980) suggested that any variable that has a unidirectional arrow aimed at it represented a dependent variable, and if not, it is considered as independent.

SEM is a family of multivariate models that focus on series of regression equations, which analysed covariance structures. Furthermore, the core parameters in this covariance structures are the regression coefficients and the variances and covariances of the variables, meaning that SEM considers the error of the measurements. One example of the language utilised, that is a simple regression could be written as $V_1 = b_{11}F_1 + E_1$, where b_{11} represents the unknown beta weight associated with the predictor F_1 and E_1 represents the error in this prediction. Note that in this case no beta weight is associated with the error term. However, in $F_2 = b_{12}F_1 + D_2$, the last one represents the error in the prediction that involves the prediction of one factor from another (Fig. 1).

With this basic information, the next step to use SEM technique would be to postulate a statistical model based on the researches' knowledge and related with the theory. Once the model is specified, the researcher would test its plausibility based on sample data that comprise all the observed variables in the model (Byrne, 2006).

The two major statistical tasks in structural equation modelling are: the estimation (involves estimating the parameters in the regression model) and the evaluation of the fit of the model. To evaluate the goodness of fit of the model, diverse indicators are used, for example: Chi-square to df ratio (χ^2/df), which is the chi-square fit index divided by the degrees of freedom. The RMSEA tells us how well the model, with

Table 1
Summary of participant data. Whole sample (N = 515) and the participants that have heard of functional foods and consumed them, that participated in SEM model (N = 197).

Participants	Whole sample		Participants that knew FF	
	N = 515	%	N = 197	%
Sex				
Female	352	68	147	75
Male	163	32	50	25
Age				
18–34	341	66	110	56
35–76	174	34	87	44
Education level				
Primary	31	6	13	7
Secondary	246	48	67	34
University	128	25	52	26
Post-graduate	110	21	65	33