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Food Quality and Preference 17 (2006) 126–131
Food Quality and Preference
www.elsevier.com/locate/foodqual

Functional foods: Consumer willingness to compromise on taste for health?

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Available online 4 May 2005

Abstract

This study investigates socio-demographic and attitudinal determinants of consumer willingness to compromise on taste for health in the specific case of the functional foods category. Cross-sectional consumer data were collected in Belgium from two socio-demographically comparable samples in 2001 and 2004 using a similar research method with personal interviews. Results show that the gap between acceptance of good versus worse tasting functional foods has widened significantly from 2001 to 2004. Whereas females and elderly were more ready to compromise on taste for health in 2001, any socio-demographic differences faded away in 2004. Health benefit belief from functional foods emerges as the strongest positive determinant of willingness to compromise on taste, but both its level and its predictive power on willingness to compromise on taste decreased over time. During the data collection interval, the perceived importance of food for health increased significantly. All evolutions combined are indicative for decreasing unconditional acceptance of functional foods, especially on taste, and a lower conviction that functional foods can constitute a part of a healthy and tasteful diet among a large majority of consumers. The conclusion is that counting on consumer willingness to compromise on the taste of functional foods for health is a highly speculative and risky strategic option.

Keywords: Consumer acceptance; Functional foods; Health; Health benefits; Taste

1. Introduction

Towards the end of the nineties, consumer acceptance was both referred to as the key success factor for functional foods and the top priority for further research (Childs & Poryzees, 1997). In result, several recent papers focusing specifically on consumer issues with respect to functional foods aimed at bridging this emerging gap in literature. Relevant papers addressed cognitive, motivational and attitudinal determinants of consumer acceptance of functional foods in different countries (Bech-Larsen & Grunert, 2003; Cox, Koster, & Russell, 2004; Urala & Lähteenmäki, 2004; Verbeke, 2005), provided insight in the profile of functional food consumers (Saher, Arvola, Lindeman, & Lähteenmäki, 2004), or identified further consumer-oriented research issues (Frewer, Scholderer, & Lambert, 2003; Holm, 2003).

All of the previously mentioned studies showed that consumer acceptance of functional foods is far from being unconditional, with one of the main conditions for acceptance pertaining to taste, besides trustworthiness of health claims. Numerous consumer studies have yet pointed to the primary role of taste as a factor that directs consumers' food choice in general (Grunert, Bech-Larsen, & Bredahl, 2000; Richardson, MacFie, & Shepherd, 1994; Shepherd, 1990; Urala & Lähteenmäki, 2003). Also in the specific case of functional foods, taste expectations and experiences have been reported as extremely critical factors when selecting this food category (Childs & Poryzees, 1997; Gilbert, 2000; Poulsen, 1999; Tuorila & Cardello, 2002). Although increasing the functionality of the food should not necessarily change its sensory quality (Urala & Lähteenmäki, 2004), bitter,

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doi:10.1016/j.foodqual.2005.03.003

acrid, astringent or salty off-flavours often inherently result from enhancing food functionality with bioactive compounds or plant-based phytonutrients. For instance, Drenowski and Gomez-Carneros (2000) indicated that food functionality enhancement poses a dilemma for functional food designers because of potential aversive consumer reactions to the resulting taste. Similarly, Tuorila and Cardello (2002) reported that the occurrence of off-flavours decreased the probability of juice liking and consumption despite the presence of convincing health claims. Also Gilbert (2000); Augustin (2001) and Cox et al. (2004) stressed that consumers will hardly be willing to compromise on the taste of functional foods for eventual health benefits. A relevant issue is whether any consumers are willing to accept functional foods that taste worse than substitute conventional foods, as suggested by Urala and Lähteenmäki (2004), and if so, what is their profile and what are the determinants of their willingness to compromise on taste.

The objective of this study is to investigate socio-demographic and attitudinal determinants of consumer willingness to compromise on taste for health in the case of functional foods as a product category. The study addresses the question who is more willing to compromise on taste, through building on cross-sectional consumer data collected from two comparable samples collected in 2001 and 2004. As such, the data set also allows investigating shifts in consumer acceptance of functional foods that taste as good versus worse than their conventional substitute food products.

2. Research method

Cross-sectional consumer data were collected through two consumer surveys in Belgium with a three-year interval in between. The first survey was organised in March 2001 with a sample of 255 Belgian consumers (Verbeke, Moriaux, & Viaene, 2001). Methods and findings from this survey are detailed in Verbeke (2005). The second survey was performed in March 2004 with a sample of 205 Belgian consumers. In both cases, respondents were responsible for food purchasing within their household, which is reflected in the gender distribution with approximately 40% males and 60% females, and they were personally interviewed. Whereas non-probability judgement sampling was used during the first survey, a quota sampling procedure with random walk recruitment of respondents was used during the second. Respondent age and presence of children younger than 12 years of age were used as quota control variables, with quota determined based on the distributions from the March 2001 survey. In result, the age and young children distributions do not differ significantly between both samples (p-value > 0.10), and match closely with distributions in the population census data (NIS, 2002). Similarly, the distribution of gender and education do not differ significantly between both samples, which yields two comparable samples in terms of socio-demographic composition (Table 1). Note that the samples are biased towards higher education. Since this bias is similar in both samples, it has no practical implications on between-sample comparisons over time. Whether this has an impact on the general findings is rather inconclusive since literature includes both studies that report a positive (Childs, 1997; IFIC, 1999), negative (Poulsen, 1999), insignificant (Verbeke, 2005), or specific product-dependent (de Jong, Ocké, Branderhorst, & Friele, 2003) association between education and functional food acceptance or use.

Question formats and measurement scales were identical in both surveys. The March 2004 survey used a

Table 1
Socio-demographic characteristics of the valid samples, comparison 2001 and 2004

	2001 (n = 255)	2004 (n = 205)	Census data[a]	Difference 2001–2004
Age				$\chi^2 = 1.47$; $p = 0.69$
<25	22.7	19.9	18.4	
25–40	29.0	33.3	32.8	
40–50	23.9	21.4	22.6	
>50	24.3	25.4	26.2	
Mean (SD)	39.9 (14.3)	40.7 (6.3)		$t = -1.22$; $p = 0.22$
Children < 12 years				$\chi^2 = 0.28$; $p = 0.60$
Yes	22.7	20.7	19.7	
No	77.3	79.3	80.3	
Education				$\chi^2 = 1.18$; $p = 0.28$
Until the age of 18	43.3	38.2	67.4	
Beyond the age of 18	56.6	61.8	32.6	
Gender				$\chi^2 = 0.78$; $p = 0.39$
Male	36.9	40.8		
Female	63.1	59.2		

[a] *Source*: NIS (2002).

slightly shorter questionnaire, focusing specifically on items with relevance to this study, hence including less filler items. Acceptance of functional foods was measured in both surveys on a five-point Likert scale with the items "I accept functional foods if they taste good" and "I accept functional foods even if they taste worse than conventional substitute foods". The latter item is considered as a measure of consumer willingness to compromise on taste when choosing for functional foods. Both for "Health benefit belief from functional foods" and for "Perceived importance of food for health", only the item with the highest item-to-total correlation from the first survey was used in the second survey. These items read "Functional foods are likely to have a beneficial impact on my personal health" and "Food plays an important role for my personal health", measured on a five- and seven-point scale, respectively.

Analyses include bivariate descriptive statistics like Pearson chi-square association tests, independent samples *t*-tests and Pearson correlation for assessing the impact of socio-demographic characteristics, and for investigating shifts over time. Finally, stepwise multiple regression was used to assess the joint impact of socio-demographics and attitudinal factors as predictors of consumer willingness to compromise on the taste of functional foods.

3. Empirical findings

The distribution of consumer acceptance of functional foods for 2001 and 2004 is presented in Fig. 1. First, acceptance of functional foods if they taste good does not differ significantly between the 2001 and 2004 sample ($t = -1.31$, $p = 0.192$ for comparison of mean scores; Pearson χ^2 association test = 2.03, $p = 0.730$) (Fig. 1a). Although the majority of respondents accept good-tasting functional foods, between one fifth and one quarter of both samples' respondents refuse to accept functional foods even if they taste good. More than

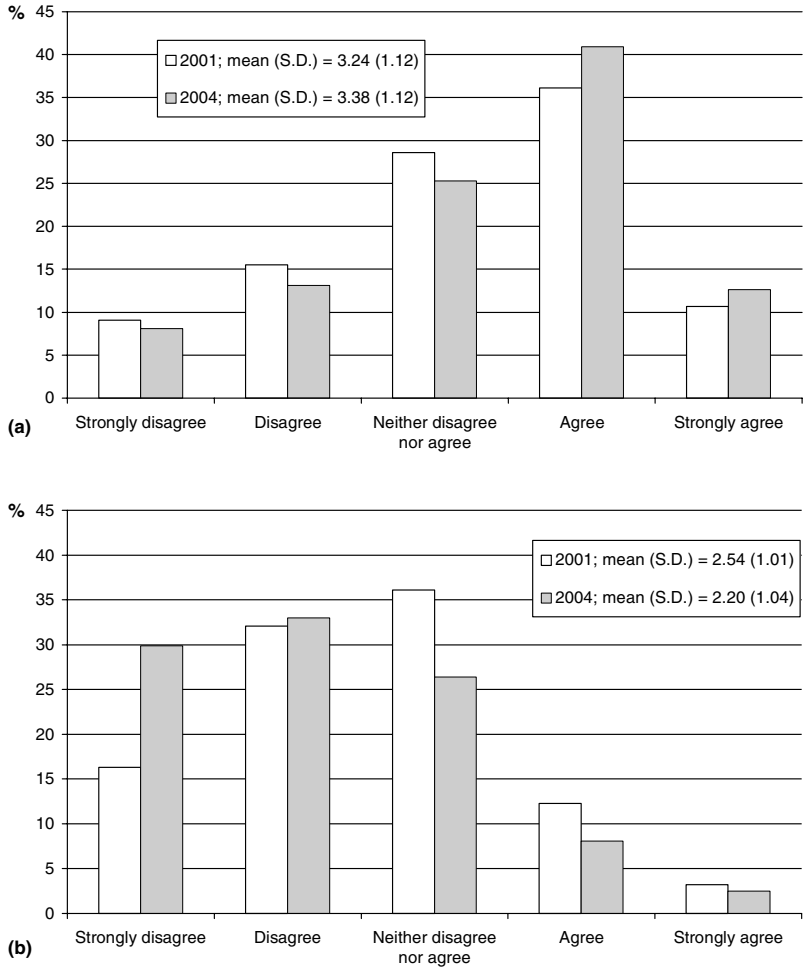

Fig. 1. Frequency distribution of consumer acceptance of functional foods, 2001 ($n = 255$) and 2004 ($n = 205$). (a) I accept functional foods if they taste good. (b) I accept functional foods if they taste worse than conventional substitute foods.

two thirds of these refusing respondents (68.3%) have a higher education ($\chi^2 = 4.28$; $p = 0.038$).

Second, acceptance of functional foods that taste worse than conventional foods has significantly decreased in 2004 as compared to 2001 ($t = 3.48$; $p < 0.001$ for comparison of mean scores; Pearson χ^2 association test = 14.59, $p = 0.006$) (Fig. 1b). A minority group of respondents (15.5% in 2001 versus 10.6% in 2004) indicates to be willing to accept functional foods even if they taste worse than substitute conventional foods, hence, these respondents claim willingness to compromise on taste when making consumption decisions about functional foods. Within the age group above 50 years, this minority group accounts for 23.3% of the aggregated sample. The association between willingness to compromise on taste and age is marginally significant for the aggregated sample. Whereas willingness to compromise on taste was significantly higher among females and correlated positively with age ($r = 0.13$; $p = 0.034$) in 2001 (Verbeke, 2005), no associations or correlations with socio-demographics were significant in the 2004 sample. The reported gender effect from 2001 contradicts the results obtained in Finland by Urala and Lähteenmäki (2004), whereas a higher willingness among older consumers corroborates the Finnish results. Similar as in the Finnish case, the differences or correlation coefficients are quite small, despite being significant in 2001.

During the three-year data collection interval, the perceived importance of food for health increased significantly from an average of 5.7 in 2001 to 6.0 on a seven-point scale in 2004 ($t = -2.09$; $p = 0.037$). Both in 2001 and 2004 female respondents reported a significantly higher perceived importance of food for health as compared to men, which is consistent with literature reporting a stronger health-orientation for food among females (Beardsworth et al., 2002; Kubberod, Ueland, Rodbotten, Westad, & Risvik, 2002; Verbeke & Vackier, 2004). No other associations with socio-demographic characteristics are found.

Meanwhile, the health benefit belief for functional foods decreased from 3.7 in 2001 to 3.4 on a five-point scale in 2004 ($t = 3.72$; $p < 0.001$). Only in the 2004 sample, a significant positive correlation between health benefit belief and age is found. No other associations between health benefit belief and socio-demographics are seen.

Table 2 presents Pearson correlation coefficients between the attitudinal variables and consumer acceptance. The highest and most significant positive correlation is between health benefit belief and acceptance of functional foods, both when good or bad tasting. Nevertheless, there are some differences between acceptance predictors of good versus bad tasting functional foods. The strength of correlation between health benefit belief and acceptance is somewhat lower in 2004 as compared to 2001 for bad tasting functional foods, whereas the opposite evolution is seen for good tasting functional foods. Also, the perceived importance of food for health correlates positively with willingness to compromise on taste and this strength of correlation has increased from 2001 to 2004. However, with respect to acceptance of good-tasting functional foods, the correlation coefficient is negative in 2001 and insignificant in 2004. Besides being indicative of consumer perception or expectation that functional foods, almost by definition, taste bad (see also Verbeke, 2005), the evolution over time shows that apparent consumers' associations in 2001 between good taste, perhaps indulgent, and hence expected to be less healthy, have disappeared in 2004. In other words, consumers no longer consider good taste and healthy as attributes for which making a trade-off is expected or even obligatory.

Table 2
Pearson correlation coefficients (r) with acceptance of functional foods

	2001 ($n = 255$)		2004 ($n = 205$)	
	Pearson r	p	Pearson r	p
If functional foods taste worse				
Functional foods health benefit belief	0.408	0.000	0.335	0.000
Perceived importance of food for health	0.154	0.014	0.247	0.001
If functional foods taste good				
Functional foods health benefit belief	0.194	0.002	0.370	0.000
Perceived importance of food for health	−0.223	0.000	−0.042	0.562

The stepwise multiple regression procedure evaluates each explanatory variable on the basis of its significance level and accumulates the model by adding or deleting variables sequentially (Greene, 1997). The final models and results are shown in Table 3. Health benefit belief of functional foods was entered in all models, which confirms its primary predictive role. The primary role of health benefit belief, or a similar attitudinal measure referring to consumers' belief in the potential beneficial impact of functional foods, is in line with all previous studies. A female gender effect in terms of higher willingness to compromise on taste is confirmed in the 2001-model only, whereas perceived role of food for health entered as a positive determinant of willingness to compromise on taste in the 2004-model for bad-tasting functional foods, and as a negative determinant in the 2001-model for good-tasting functional foods. It is noteworthy that other demographic variables like age, presence of young children and education did not enter the stepwise regression models, even when relaxing the F-test statistic probability to 0.10.

Table 3
Stepwise multiple regression with acceptance of functional foods as dependent variable

Variable entered	2001 (n = 255)				2004 (n = 205)			
	B	SE	t	p	B	SE	t	p
If functional foods taste worse								
Functional foods health benefit belief	0.48	0.07	7.01	<0.001	0.37	0.08	4.71	<0.001
Perceived importance of food for health			NS		0.18	0.06	3.10	0.002
Gender female	0.25	0.12	2.04	0.042			NS	
Adjusted R^2			0.173				0.153	
If functional foods taste good								
Functional foods health benefit belief	0.37	0.08	4.53	<0.001	0.46	0.08	5.51	<0.001
Perceived importance of food for health	−0.24	0.05	−5.02	<0.001			NS	
Gender female			NS				NS	
Adjusted R^2			0.119				0.135	

NS = not significant ($p > 0.05$).

4. Discussion and conclusion

As analysed from comparable samples from 2001 and 2004, the gap between acceptance of good versus worse tasting functional foods has widened, together with a decreased belief in potential health benefits from functional foods, while the perceived importance of food for health increased in the same samples. The two surveys tell us that the Belgian consumer is rather critical towards the concept of functional foods in general, that this critical attitude has grown during 2001–2004 and has translated into a lower willingness to compromise on taste for health in the case of functional foods as a product category. The empirical findings indicate that acceptance of functional foods has become more conditional, particularly with respect to taste, and that monitoring taste emerges as an extremely critical factor for the future acceptance of functional foods. Differences in the role of variables that predict the acceptance of good-tasting versus bad-tasting functional foods, and related shifts over time, indicate also that consumers have become more convinced that good taste and healthiness are not necessarily to be traded-off against each other.

The market segment of consumers who are ready to accept immediate and noticeable worse taste for potential future health benefits has decreased in size, and especially in 2004, it cannot be identified using classical socio-demographic consumer characteristics. The finding in 2001 that women and elderly were more ready than men and younger consumers to compromise on the taste of functional foods was not confirmed in 2004 where any socio-demographic differences faded away.

Instead, health benefit belief consistently emerges as a strong positive determinant of functional food acceptance in general, and willingness to compromise on taste, but together with a lower health benefit belief, its impact on accepting bad tasting functional foods also slightly decreased over time. Furthermore, the finding that the perceived importance of food for health entered the regression model as a significant predictor of readiness to compromise on taste in 2004 indicates that health-orientation, more than before, is the driver or motivation for being willing to compromise on taste. The increasing perceived importance of food for health, combined with the decreasing belief in health benefits from functional foods—which in the end translate into a lower willingness to compromise on taste in 2004—are evolutions that are indicative for a lower conviction that functional foods can constitute a part of a healthy and tasteful diet among the majority of consumers.

It should be noted that this study dealt with consumer willingness to compromise on the taste of functional foods in general, without considering on specific functional food product categories and associated health claims. In this respect, Urala and Lähteenmäki (2004) indicate that some products may have such a strong health claim that consumers are still ready to compromise on taste. Our results might be interpreted as indicative for the general or average case, around which willingness to compromise on taste may vary to some extent depending on the specific product category and health benefit strength that is considered. Future research focusing on specific functional foods, rather than on functional foods as an abstract product category, and on associated health-related messages with varying strength or convincing argument is recommended.

This study adds to the literature reporting that consumers in general are hardly willing to compromise on the taste of functional foods for health. The overall conclusion from our study corresponds with Hilliam (2003) who indicated that, although consumer demand is undoubtedly there, the functional food industry must manage to respond with good-tasting solutions in order to maintain its current stars and future cash cows. Hoping for consumer willingness to compromise on the taste of functional foods for health is highly speculative, risky

and deemed to yield a niche market strategy. This conclusion entails a challenging future for food product designers, food technologists and sensory scientists dealing still with one of the fastest growing segments of the food market in wealthy nations.

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