European consumers' perceived seriousness of their eating habits relative to other personal health risks

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ARTICLE INFO

ABSTRACT

Objective. Poor eating habits are a key priority on the European public health agenda due to their large health and economic implications. Healthy eating interventions may be more effective if consumers perceive their eating habits as a more serious personal health risk. This study investigates European consumers' perceived seriousness of their eating habits, its determinants and relative importance among other potential personal health risks including weight, stress and pollution.

Method. A quantitative survey was conducted during Spring 2011 among samples representative for age, gender and region in five European countries (n = 3003).

Results. Participants were neutral towards the seriousness of their eating habits for personal health. Eating habits were ranked third after stress and weight. Gender, age, country, health motive, body mass index, and subjective health status were important determinants of the perceived seriousness of their eating habits, whereas perceived financial condition, smoking and education were insignificant.

Conclusion. Eating habits were perceived more seriously by women, Italians, obese, and younger individuals with stronger health motives and fair subjective health status. Nevertheless, other health risks were often considered more important than eating habits. More or specific efforts are required to increase Europeans' awareness of the seriousness of their eating habits for personal health.

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Introduction

With the public's increased awareness of causative and preventive effects of certain foods on health, food-related health has been of increasing importance for consumer food choice (Grunert, 2006). The rising prevalence of diet-related non-communicable chronic diseases like obesity suggests that many consumers are not capable and/or as motivated as they claim, to make healthy food choices. For these reasons, nutrition is a key priority in the European Union (EU) public health policies (Commission of The European Communities, 2007). Many EU Member States have developed policy interventions to promote healthy eating habits whose effectiveness may strongly differ between individuals and cases (Capacci et al., 2012; Traill et al., 2010). Next to health, taste and price have been competing priorities in relation to food choice (Drichoutis et al., 2005). Consumers may prefer the immediate benefits of a tasteful food product over the long-term benefits of a healthy food (Verbeke, 2006). Also consumers' awareness of the seriousness of

specific health-related behaviours may not necessarily be reflected in their own behaviour (van der Pligt, 1998). For example, smokers generally agree with the adverse health impact of smoking, but do not believe themselves to be personally at risk (Lee, 1989; Mckenna et al., 1993).

Perceived seriousness or severity is at the core of several theoretical models of preventive health behaviour, essentially the Health Belief Model (Rosenstock, 1974) and related models (e.g. Theory of Protection Motivation (Rogers, 1975)), and it is also implicit as behavioural belief in the Theory of Planned Behaviour (Ajzen, 1991; Mazzocchi et al., 2008). These models posit that the more serious a person perceives his/her personal risk from a behaviour, the higher the personal relevance of that behaviour and the more receptive one is to any information and other cues concerning the behaviour, which potentially drives a person to take appropriate action. While there is a growing body of literature on the association between perceived seriousness of preventive health behaviour and the behaviour itself (e.g. Harvey and Lawson, 2009; Marcell and Halpern-Felsher, 2005; McLeod and Johnson, 2011; Milne et al., 2000), to the authors' knowledge no study thus far has investigated the perceived seriousness of eating habits as such and relative to other health-related personal risks in a cross-cultural setting.

Based on previous theoretical models, the basic assumption from which the study departed was that the higher a person's perceived seriousness of his/her eating habits, the higher the probability of being

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receptive to health promotion activities and policy measures. Three questions were raised. First, to what extent do Europeans consider their eating habits as a potentially serious risk for their personal health? Second, how seriously do they consider it among other potential personal risks? Third, what explains potential differences in the perceived seriousness of eating habits? Consequently, the objective of this paper was to investigate the determinants of European consumers' perceived seriousness of eating habits and its relative importance among other potential personal health risks including weight, stress and pollution. The health risks including weight, stress and pollution were selected based on the list of major global health risks reported by WHO (2009).

Methods

Study design and population

Cross-European data were collected during Spring 2011 through a cross-sectional quantitative survey with samples representative for age, gender and region in five European countries: UK (n = 603), Italy (n = 600), Belgium (n = 600), Denmark (n = 600) and Poland (n = 600). These countries were selected in order to cover the geographical North–South and East–West axes of Europe. A total of 3003 participants between the ages of 16 and 99 years were selected by means of probabilistic sampling from the online access proprietary panel of the GfK NOP market research agency. Corrective post-stratification weights were applied to ensure national representativeness in terms of age and gender. All procedures for contact and questionnaire administration were electronic through Computer Assisted Web Interviewing.

Measurement and scaling

European consumers' perceived seriousness of personal health risks was measured using a 7-point interval scale using the statement "Thinking about your own health, how serious do you consider your eating habits/your weight/your stress level to be/pollution where you live", based on Oliver and Lee (2005). The anchor points of the scale were: "not at all serious" (=1), "neutral" (=4) and "very serious" (=7). The response categories 2 and 3 ("rather not serious"), and 5 and 6 ("rather serious") were merged for the final regression analysis for facilitating the interpretation and clarity of presentation. From this set of questions, a variable was created to measure how the perceived seriousness of eating habits ranks compared to the other health risks; i.e. the relative perceived seriousness of eating habits for personal health. The variable assumes discrete values between 1 and 4, where the value of 1 indicates that all other conditions are perceived as more serious than the eating habits. A value equal to 4 means that no other health risk is perceived as more serious than the eating habits, i.e. eating habits are considered a top risk in terms of perceived seriousness for personal health.

Explanatory variables included socio-demographics such as gender, country (UK, Italy, Belgium, Denmark and Poland), educational level (low: primary and lower secondary education completed; medium: higher secondary education completed; high: university-level diploma and higher completed), perceived financial condition ((very) bad, fair, (very) good) and age. Additional variables included the body mass index (BMI) based on self-reported weights and heights (underweight: <18.5 kg/m², normal weight: 18.5–24.9 kg/m², overweight: 25–29.9, obese: ≥30 kg/m²), subjective health status (SHS) ((very) bad, fair, (very) good), smoking status (non-smoker: either never smoked or quitted smoking; light smoker: ≤five cigarettes per day; medium smoker: 6–20 cigarettes per day; heavy smoker: >20 cigarettes per day), and health motive underlying meal choices. The latter was measured based on a scale developed and validated in the EU FP5 project Trust (Lobb et al., 2007; Mazzocchi et al., 2008) and pilot-tested here. This four-item scale was validated by means of a confirmatory factor analysis, indicating good internal reliability (Cronbach's alpha = 0.88) and reporting significant factor loadings (ranging from 0.85 to 0.92). Participants were asked to rate on a 7-point scale how important (ranging from "extremely unimportant" to "extremely important") the "Fat content", "Calorie content", "Cholesterol content", "Healthiness of foods" (among others) are to their household main meal.

The master questionnaire was developed in English and translated into the national languages using back-translation to ensure linguistic equivalence (Brislin, 1970; Maneesriwongul and Dixon, 2004). Before starting with the field-work, the questionnaire was extensively pretested through personal interviews with 15–20 participants in each country. No modifications were required for the questions considered here after pretesting.

Statistical analyses

Descriptive statistics including frequency distributions and cross-tabulations were reported. An ordinal regression was applied to explain the perceived seriousness of the eating habits as such (Model 1) and relative to other personal health risks (Model 2). Since the assumption of parallel lines was violated in some independent variables, a Generalized ordered logit model with partial proportional odds (PPO) was estimated instead of the more conservative Ordered logit model with proportional odds (O'Connell, 2006). Violation of the parallel-lines assumption means that at least some independent variables systematically interacted with differential response categories of the dependent variable. For instance, the odds of perceiving the eating habits as a top risk (in terms of perceived seriousness) decreased, but the odds of perceiving it as the lowest risk (among other personal risks) increased for obese compared to normal weight people in Model 2 (Table 3). Results are reported as odds ratio (OR) with 95% confidence intervals (95% CI). OR above 1 indicates that higher values on the independent variable make it more likely that the individual will be in a higher category of the dependent variable than the current one, whereas OR below 1 indicates that higher values on the independent variable increase the likelihood of the respondent to be in the current or a lower category of the dependent variable. McFadden's pseudo R^2 is reported as an indicator of the model fit (McFadden, 1973). Note that this value cannot be interpreted in terms of the R^2 statistic of the linear regression, particularly because of its downward bias in ordinal outcome variables (Veall and Zimmermann, 1996).

Descriptive statistics were calculated with SPSS Statistics 20.0 (IBM SPSS, Armonk, NY, USA). Ordinal regression based on the PPO model was performed with Stata 11.0 software (Statacorp, College Station, TX, USA) using the gologit2 command and its autofit option (Williams, 2006). The autofit option searches for the best model fit while iteratively upholding or releasing the parallel lines' assumption for the separate independent variables.

Results

Sample characteristics including socio-demographics, health behaviours and conditions, and the association with the perceived seriousness of eating habits are presented in Table 1. Both genders were equally represented as the study population was intentionally not restricted to the main responsible for food purchasing. About 40% of the sample had higher education and an almost equal number had medium education. Most participants were non-smokers with normal weight who perceived their health status as good and for whom the health motive is rather important for food choices. Overall, participants perceived their eating habits neither serious nor unserious (mean = 4.07 ± 1.79 on a 7-point scale). The highest perceived seriousness of eating habits for personal health was observed for women, Italians, people with obesity, individuals with medium education and those who perceived their financial condition to be (very) bad and their health status fair to very bad. Eating habits were perceived less serious than stress (mean = 4.31 ± 1.82) and weight (mean = 4.25 ± 1.91), but more serious than pollution (mean = 3.92 ± 1.84) (all paired test p-values < 0.001).

Table 2 reports the results of the regression model of European consumers' perceived seriousness of their eating habits for personal health by their socio-demographic characteristics, health behaviour and determinants, and health condition (Model 1). Female, overweight and obese people (compared to normal weight) and people with a stronger health motive were significantly more likely to perceive their eating habits seriously. Increasing age decreased the odds of perceiving the eating habits as serious. Cross-country differences were observed, where the perceived seriousness of eating habits was highest among Italians, followed by British and Belgians, and the lowest among Polish and Danish. The perceived financial condition and smoking status were weakly related to the perceived seriousness of eating habits, while educational level was not related. People who perceived their health status as very good were more likely to perceive their eating habits as not at all serious compared to those who perceived their health status as good. A fair

Table 1
Description of the study sample (n = 3003).

		Frequency (%)	Perceived risk from eating habits	
			Mean (SD)[x]	p-Value[y]
Socio-demographic characteristics				
Gender	Female	51.4	4.2 (1.8)[a]	
	Male	48.6	3.9 (1.8)[b]	<0.001[z]
Age (years)	Mean (SD)	47.7 (15.9)		
Country of origin	UK	20.1	3.9 (1.7)[b]	
	Italy	20.0	5.0 (1.7)[a]	
	Belgium	20.0	4.0 (1.7)[b]	
	Poland	20.0	3.8 (1.8)[b]	
	Denmark	20.0	3.4 (1.7)[c]	<0.001
Educational level	Low	14.5	3.9 (1.8)[b]	
	Medium	44.3	4.2 (1.8)[a]	
	High	41.2	4.0 (1.8)[b]	<0.010
Perceived financial condition	Very bad	6.5	4.5 (1.8)[a]	
	Bad	19.3	4.4 (1.8)[a]	
	Fair	39.6	4.1 (1.8)[b]	
	Good	20.2	3.8 (1.8)[c]	
	Very good	12.2	3.6 (1.8)[c]	<0.001
	Mean (SD)	3.0 (1.2)		
Health behaviour and determinants				
Health motive for food choice	Mean (SD)	5.3 (1.3)		
Smoking status	Non-smoker	72.6	4.0 (1.8)	
	Light smoker	4.6	4.2 (1.8)	
	Medium smoker	19.1	3.9 (1.9)	
	Heavy smoker	3.7	4.1 (1.9)	0.273
Health condition				
BMI	Underweight	3.2	3.8 (1.9)[b,c]	
	Normal weight	42.9	3.8 (2.0)[c]	
	Overweight	35.1	4.1 (1.7)[b]	
	Obese	18.9	4.3 (1.6)[a]	<0.001
	Mean (SD) (kg/m²)	26.0 (5.1)		
Subjective health status	Very bad	1.5	4.2 (1.8)[a,b]	
	Bad	6.7	4.0 (1.9)[a,b]	
	Fair	31.6	4.3 (1.6)[a]	
	Good	43.0	3.9 (1.8)[b]	
	Very good	17.2	3.7 (2.1)[c]	<0.001
	Mean (SD)	3.7 (0.9)		

This study was conducted in five European countries: UK, Italy, Belgium, Poland and Denmark (Spring 2011).

[a,b,c]Superscripts indicate significant differences by one-factor ANOVA.

[x] Measured on a 7-point interval scale.

[y] p-Value corresponds to the Kruskal–Wallis equality-of-populations rank test (unless otherwise stated).

[z] p-Value corresponds to the nonparametric Wilcoxon's rank-sum test (Mann–Whitney U test).

compared to good SHS increased the odds of perceiving the eating habits more seriously. Participants who reported their health status to be bad and very bad had similar ratings of perceived seriousness as those with a good SHS.

The associations between the independent variables in Model 1 and the relative perceived seriousness of eating habits for personal health are reported in Table 3 (Model 2). Only a few variables were found to be significantly related to the relative perceived seriousness of eating habits. Females were less likely to perceive their eating habits as a top risk (in terms of perceived seriousness for personal health) among other personal risks. The odds of perceiving eating habits as the lowest risk were higher with increasing age and among Italians, Belgians and Polish (compared to British), medium smokers (compared to non-smokers), and people perceiving their health status as very good. People with obesity and those who perceived their health status as very bad were less likely to perceive eating habits as a top risk, while a favourable perception of the financial condition increased the odds to consider it as a top risk. However, people with obesity were also less likely to consider eating habits as the lowest risk.

Discussion

European consumers were on average neutral towards the seriousness of their eating habits for personal health. Greater importance was attached to stress and weight. This finding suggests that personal health risks with more immediate, visible and tangible adverse health impacts are given priority above those with long-term consequences (Ganz, 2000). Only a few variables were found to be significantly related to the relative perceived seriousness of eating habits, which can be explained by the fact that the majority (about 75%) of the study sample considered eating habits as the least or second least serious health risk.

The highest perceived seriousness of eating habits was observed among women, Italians, obese, and younger individuals with higher health motives and a fair SHS. However, it should be noted that among this group other health risks may still be considered more important than eating habits. The perceived financial condition and smoking status were weakly related to the perceived seriousness of eating habits, while the educational level was not related. For people who perceived the role of eating habits in their personal health as less serious like men, Danish and Polish consumers, older individuals and those who perceived their health status to be (very) bad, it will be important to raise their awareness of the potential health impact of their eating habits.

Increasing age was found to decrease the odds of perceiving eating habits seriously in terms of personal health. However, older people could have been expected to consider their eating habits relatively more serious (Renner et al., 2000). A possible explanation is that with increasing age, people more frequently adopt better eating habits (whether or not on prescription) (Howarth et al., 2007). According to Brewer et al. (2004), people who engage in a health-related behaviour tend to reduce their risk perceptions. Since data on participants' actual eating behaviour is not available within our study, proxies for health condition (i.e. BMI and SHS) were included in the analyses.

Cross-cultural differences in the perceived seriousness of eating habits were observed in line with the findings of the Eurobarometer on food-related risks (European Commission, 2010). This survey found that citizens from Member States that most recently joined the EU and the Mediterranean countries tend to express the highest levels of concern of not having a healthy and balanced diet. As such, a higher perceived seriousness of the eating habits could have been expected among Italians and Polish. This study confirms the expectation for Italy, but not for Poland where the seriousness of eating habits was perceived to be lower compared to the UK.

From a bad to very good SHS, the perceived seriousness of the eating habits reached a maximum among participants with a fair SHS and a minimum among those with a very good SHS. A possible explanation is that people with a bad SHS may have become more ignorant about the seriousness of their eating habits and/or may simply believe that their bad health status cannot be improved by changing their eating habits. People with a fair SHS hold a stronger belief that their eating habits can contribute to their personal health and can still be improved as it is reported to be neither good nor bad. People with a good or very good SHS may believe that their eating habits are good enough not to worry about them. When relating SHS with BMI (proxy for actual health status), it was found that the less favourable participants perceived their health status, the higher their BMI was (p < 0.001).

A major strength of the study is the estimation of perceived seriousness of own behaviour instead of health-related behaviour in general (van der Pligt, 1998). Another strength pertains to the large, cross-cultural and quasi-representative samples (except for education), combined with the advanced multivariate ordinal regression analysis that allowed to investigate the associations and variance in perceived seriousness taking several relevant independent variables into account simultaneously (O'Connell, 2006).

Some limitations should be acknowledged when interpreting our findings. First, the results are based on cross-sectional data. The study design does not allow to draw conclusions about causal relationships.

Table 2
Results from multivariate logistic regression for ordinal response variables: Perceived seriousness of eating habits by socio-demographic characteristics, health behaviour and determinants, and health condition (OR (95% CI)).

Model 1: Perceived seriousness of eating habits for personal health		Perceived seriousness higher than "not at all serious"	Perceived seriousness higher than "rather not serious"	Perceived seriousness higher than "neutral"	Perceived seriousness higher than rather "serious"
Socio-demographic characteristics					
Gender (vs. men)	Female	1.35 (1.15–1.58)[a,b]	–	–	–
Age		0.96 (0.96–0.97)[b]	0.98 (0.97–0.98)[b]	0.98 (0.97–0.98)[b]	0.97 (0.96–0.99)[b]
Country of origin (vs. UK)	Italy	2.56 (2.00–3.29)[a,b]	–	–	–
	Belgium	0.81 (0.58–1.13)	1.14 (0.87–1.50)	1.06 (0.82–1.38)	0.72 (0.45–1.14)
	Poland	0.61 (0.47–0.78)[a,b]	–	–	–
	Denmark	0.59 (0.47–0.75)[a,b]	–	–	–
Education level	Low	0.84 (0.67–1.05)[a]	–	–	–
(vs. medium)	High	1.07 (0.91–1.27)[a]	–	–	–
Perceived financial condition	Very bad	0.98 (0.57–1.69)	1.56 (1.04–2.36)[b]	1.06 (0.74–1.54)	1.81 (1.06–3.10)[b]
(vs. fair)	Bad	1.13 (0.92–1.40)[a]	–	–	–
	Good	0.94 (0.76–1.17)[a]	–	–	–
	Very good	0.79 (0.61–1.03)[a]	–	–	–
Health behaviour and determinants					
Health motive		1.02 (0.91–1.15)	1.04 (0.96–1.13)	1.26 (1.17–1.37)[b]	1.91 (1.57–2.34)[b]
Smoking status	Light	0.68 (0.37–1.23)	1.43 (0.87–2.35)	1.45 (0.92–2.27)	0.54 (0.236–1.255)
(vs. non-smoker)	Medium	0.60 (0.45–0.81)[b]	0.91 (0.73–1.14)	0.89 (0.72–1.11)	1.26 (0.878–1.817)
	Heavy	0.94 (0.62–1.42)[a]	–	–	–
Health condition					
BMI	Underweight	0.77 (0.52–1.14)[a]	–	–	–
(vs. normal weight)	Overweight	2.62 (1.95–3.53)[b]	2.18 (1.74–2.73)[b]	1.76 (1.43–2.18)[b]	1.00 (0.69–1.46)
	Obese	3.85 (2.57–5.75)[b]	3.38 (2.56–4.47)[b]	2.39 (1.85–3.09)[b]	1.48 (0.96–2.29)
Subjective health status	Very bad	0.96 (0.32–2.89)	0.81 (0.34–1.94)	1.53 (0.69–3.36)	1.75 (0.52–5.96)
(vs. good)	Bad	1.25 (0.86–1.82)[a]	–	–	–
	Fair	1.41 (1.18–1.69)[a,b]	–	–	–
	Very good	0.46 (0.35–0.61)[b]	0.76 (0.60–0.96)[b]	1.09 (0.86–1.38)	1.30 (0.88–1.92)

This study was conducted in five European countries: UK, Italy, Belgium, Poland and Denmark (Spring 2011).
[a] Parallel lines assumed.
[b] Significant differences in perceived seriousness between groups defined by socio-demographic characteristics, health behaviour and determinants, and health condition.

Second, when compared to the OECD statistics for education (OECD, 2012), the sample is slightly biased towards higher educated people. This overrepresentation of higher education is attributed to the use of a web-based data collection method which has the advantages of being cost effective, reducing the turnaround time and enhancing survey item completion rates (Schleyer and Forrest, 2000). Nevertheless,

Table 3
Results from multivariate logistic regression for ordinal response variables: Relative perceived seriousness of eating habits vs. other personal risks by socio-demographic characteristics, health behaviour & determinants, and health conditions (OR (95% CI)).

Model 2: Relative perceived seriousness of eating habits vs. other risks		Risk at least 2nd order	Risk at least 3rd order	Top risk
Socio-demographic characteristics				
Gender (vs. men)	Female	1.07 (0.90–1.28)	0.91 (0.75–1.11)	0.58 (0.39–0.85)[b]
Age		0.99 (0.98–0.99)[a,b]	–	–
Country of origin (vs. UK)	Italy	0.75 (0.58–0.98)[a,b]	–	–
	Belgium	0.63 (0.48–0.82)[b]	0.75 (0.56–1.01)	1.27 (0.79–2.05)
	Poland	0.77 (0.59–1.00)[a,b]	–	–
	Denmark	1.23 (0.96–1.58)[a]	–	–
Educational level	Low	0.96 (0.76–1.21)[a]	–	–
(vs. medium)	High	1.09 (0.92–1.29)[a]	–	–
Perceived financial condition	Very bad	0.79 (0.57–1.09)[a]	–	–
(vs. fair)	Bad	1.13 (0.92–1.39)[a]	–	–
	Good	1.11 (0.88–1.39)	1.52 (1.19–1.95)[b]	1.17 (0.73–1.88)
	Very good	0.86 (0.66–1.11)[a]	–	–
Health behaviour and determinant				
Health motive		1.00 (0.93–1.06)[a]	–	–
Smoking status	Light	1.06 (0.72–1.55)[a]	–	–
(vs. non-smoker)	Medium	0.78 (0.63–0.96)[b]	0.96 (0.75–1.22)	1.39 (0.89–2.17)
	Heavy	1.18 (0.81–1.71)[a]	–	–
Health condition				
BMI	Underweight	1.21 (0.84–1.75)[a]	–	–
(vs. normal weight)	Overweight	1.22 (1.00–1.48)	1.23 (0.98–1.53)	0.67 (0.44–1.03)
	Obese	1.51 (1.19–1.92)[b]	1.36 (1.04–1.77)[b]	0.51 (0.28–0.95)[b]
Subjective health status	Very bad	0.81 (0.36–1.80)	0.68 (0.31–1.53)	0.00 (0.00–0.00)[b]
(vs. good)	Bad	0.83 (0.59–1.15)[a]	–	–
	Fair	1.16 (0.96–1.39)[a]	–	–
	Very good	0.71 (0.56–0.89)[b]	1.16 (0.90–1.50)	1.20 (0.73–1.96)

This study was conducted in five European countries: UK, Italy, Belgium, Poland and Denmark (Spring 2011).
[a] Parallel lines assumed.
[b] Significant differences in relative perceived seriousness between groups defined by socio-demographic characteristics, health behaviour and determinants, and health condition.

the educational level was not significant in both regression models. Therefore, the effect of the potential bias originating from the educational level on present findings was considered not relevant. Third, the perceived seriousness of health risks may not only be explained by socio-demographic characteristics, health behaviour (other than eating habits) and health conditions, but it may also depend on context factors and the point in time (Brewer et al., 2004). Further research investigating the effect of a broader range of person-related factors (e.g. background attitudes and knowledge), product-related factors (e.g. price), physical and social environmental factors (e.g. situation, illness in the social environment) together with those considered in this study is recommended. Also other health risks (e.g. physical inactivity, high blood pressure) may provide additional insights.

In conclusion, European consumers underestimate the seriousness of their eating habits for personal health. Eating habits are perceived as more serious among women, Italians, obese, and younger individuals with a stronger health motive and a fair SHS. This population group may therefore be more receptive to healthy eating interventions. Nevertheless, other potential health risks may still be considered more important than personal eating habits. Additional efforts are needed to raise Europeans' awareness of the seriousness of their eating habits for personal health, especially among population groups who perceive their eating habits less serious.

Conflict of interest statement

Acknowledgments

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