

BENEFIT BELIEFS, ATTITUDES AND BEHAVIOUR TOWARDS FRESH VEGETABLE CONSUMPTION IN POLAND AND BELGIUM

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(Received: 2 April 2004; accepted: 21 November 2005)

This paper reports findings from a cross-sectional consumer survey on benefit beliefs, attitudes and behaviour towards fresh vegetables in Poland and Belgium. The Theory of Planned Behaviour (TPB) served as basic frame of reference for the analysis of consumer's decisions towards fresh vegetables. Benefit beliefs were investigated through principal component analysis and used for belief-based market segmentation. Health and prevention, hedonism, and nutrition are found to be the main beliefs associated with eating fresh vegetables. Three distinct clusters with different socio-demographic composition, attitudes and behaviour emerged. The findings point towards a need for greater attention to young males in future health communication, irrespective of nationality. Polish consumers claim lower fresh vegetable intake, despite stronger health benefit beliefs as compared to Belgians. Potential explanations for cross-national differences may pertain to the availability and variety of fresh vegetables, particularly during winter time. Investigation of the TPB confirms a strong positive predictive link between attitude and behavioural intention of eating fresh vegetables, as well as between intention and behaviour in the strict sense. Perceived behavioural control and subjective norm were insignificant as determinants of behavioural intention in the TPB model.

Keywords: benefit beliefs, consumer, fresh vegetables, Theory of Planned Behaviour

In recent years there has been increasing publicity about the benefits of consuming diets rich in vegetables (VAN DUYN & PIVONKA, 2000; LAMBERT, 2001). Dietary recommendations around the world are consistent in advocating high intakes of vegetables to help prevent a wide range of chronic diet-related diseases, including cardiovascular diseases, cancers (COX et al., 1998), cataracts (JACQUES et al., 1994), stroke and a number of other health problems (WCRF, 1997). In addition, high consumption of vegetables may displace other foods from the diet, thereby indirectly reducing fat intake (HU et al., 2000; LI et al., 2000; WCRF, 1997).

The World Health Organisation (WHO, 1990) recommends a daily intake of at least 400 g of vegetables and fruits (in addition to potatoes) including, within that, at least 30 g of legumes, nuts and seeds. This minimum guideline has been translated into the concept of "Five-a-day" equating to a recommendation to eat at least five 80 g portions of vegetables and fruits per day (WILLIAMS, 1995). Despite the implementation of nutrition education interventions aimed at encouraging minimum intakes of five

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portions of fruit and vegetables per day (ANDERSON et al., 1998; COX et al., 1998), vegetable consumption levels remained substantially below recommended levels in many developed Western and Central European countries (STEINMETZ & POTTER, 1996; THOMPSON et al., 1999; LI et al., 2000; RURIK & ANTAL, 2003). The recommendations by both the Polish National Nutrition Institute (IZZ, 2001) and the Flemish Institute of Health Promotion (VIG, 2003) correlate with WHO guidelines. Nevertheless, statistical data from both countries show that the level of fresh vegetables consumed by Poles and Belgians is too low. The per capita vegetable consumption (based on supply balance sheets) in both countries amounted to approximately 120 kg per capita per year (CLE, 2000; GUS, 2001).

Many previous studies concentrated on consumers' motives and barriers to increase vegetable consumption (ANDERSON et al., 1993; MARSHALL et al., 1994; 1995; COX et al., 1996) and factors influencing vegetable intake (LEATHER, 1995; DE IRALA-ESTEVEZ et al., 2000; BABICZ-ZIELINSKA, 2001; RAGAERT et al., 2004). Reviews of literature show that taste preferences are the strongest determinant of vegetable consumption (HEIMENDINGER & VAN DUYN, 1995; WARDLE, 1995; COX et al., 1996; DRENOWSKI et al., 1999). The strongest influential beliefs with respect to vegetables pertain to healthfulness, high nutritional value, family liking and fitting into habits (COX et al., 1996; ANDERSON et al., 1998).

Personal factors such as age and gender frequently emerge as determinants of food choice of individual consumers. In general, women report higher health consciousness and higher compliance with dietary recommendations (KUBBEROD et al., 2002; BEARDSWORTH et al., 2002; VERBEKE, 2005), which is also reflected in a higher intake of vegetables as compared to men (LIEBMAN et al., 2003). Specifically, BABICZ-ZIELINSKA (2001) found that females rated factors like "good for health", "nutritive", "popular use", "easy to store" and "visual appearance" of vegetables higher than males. The situation with age is similar, in that higher age usually corresponds to stronger compliance with dietary recommendations.

Psychosocial factors (such as self-efficacy, attitudes, beliefs and barriers) and dietary habits also have an influence on vegetable consumption (BRUG et al., 1995; SATIA et al., 2002). The results of a study carried out in The Netherlands showed that self-efficacy (reflected as respondents' ability to consume an adequate amount of fruit and vegetables in various situations) and attitudes (a.o. beliefs about taste and health consequences) were consistently and significantly associated with the consumption of prepared vegetables and salads (BRUG et al., 1995).

The objectives of this paper are to investigate consumer beliefs related to eating fresh vegetables within Poland and Belgium. Those two countries differ from geographical, economical and cultural point of view. Poland joined the EU the 1st of May 2004, while Belgium has been a member from the very beginning. Furthermore, both countries differ considerably in terms of culture, tradition, and food habits. Generally, communication confirming and strengthening existing beliefs, i.e. so-called consonant information, has a higher chance for success in terms of reaching the target population as compared to communication that aims at removing attitudinal barriers

(dissonant information). Hence, a thorough understanding of consumer's benefit beliefs is viable for developing more effective health communication, since they are based on positive attitudinal structures. In order to achieve a better understanding of benefit beliefs towards fresh vegetables, belief structures will first be explored through factor analysis. Second, cluster analysis will be performed to detect belief-based market segments. Third, segments will be profiled in terms of beliefs, attitudes, behaviour and socio-demographics. Finally, consumer's decisions towards fresh vegetables will be analysed using the Theory of Planned Behaviour.

1. Materials and methods

1.1. Consumer survey

The empirical research included a cross-sectional consumer survey conducted in November 2002 in Belgium and in January 2003 in Poland. A sample of 245 consumers aged between 18 and 77 years participated in the survey. Respondents were selected using the procedure of quota sampling, with age and gender as control categories. The final sample (Table 1) is reasonably balanced in terms of gender, nationality and age groups, though without being statistically representative for the population. Hence, findings hold specifically within the sample and extrapolation of conclusions to the general public remains speculative.

The information was gathered through a self-administered questionnaire including three parts: (1) a section on demographics, restricted to age and gender; (2) a section on benefit beliefs; and (3) a battery of direct and indirect questions fitting within the Theory of Planned Behaviour (TPB, see section 1.2). All questions related to benefit beliefs and the TPB were evaluated on 7-point Likert scales. Behaviour was measured as the number of portions of fresh vegetables eaten during the last two days. Behavioural intention was assessed as a three-item construct probing at the intended number of portions to be eaten during the next two days, intended use of vegetables as snack between meals, and purchase intention.

1.2. Theory of Planned Behaviour

In this study, the Theory of Planned Behaviour (TPB) was applied to investigate the cognitive influences by which the rational behaviour of consumers may be predicted. The TPB has been developed from the earlier Theory of Reasoned Action (AJZEN & FISHBEIN, 1980). The Theory of Reasoned Action is a theory of attitude-behaviour relationships, which posits causal links between various cognitive variables. Specifically, the theory suggests that volitional behaviours arise from people's intentions and also that attitudes and subjective norms (AJZEN & FISHBEIN, 1980; SPARKS et al., 2001) determine those intentions. The Theory of Planned Behaviour adds a measure of perceived behavioural control as a predictor of intentions and as a

component that directly contributes an independent predictive effect on behaviour at those occasions where it corresponds to actual control over behaviour (AJZEN, 1991; SPARKS et al., 2001).

Although the TPB has been applied to numerous different food and diet related behaviours (PAISLEY & SPARKS, 1998; JANUSZEWSKA & VIAENE, 2001; SCHOLDERER & GRUNERT, 2001; MESSINA et al., 2004; VERBEKE & VACKIER, 2005), relatively few studies have used it specifically to examine intentions to vegetable intake (LIEN et al., 2002). Typically, active reasoning is associated with high consumer involvement and opposes habitual, routine or impulsive behaviour. Since many basic food products, such as fresh vegetables, are believed to be low involvement products, the validity of the TPB in the simple case of fresh vegetables is debated.

1.3. Analyses procedures

Data were analysed using the statistical software SPSS version 11.0. First, factor and cluster analysis are performed. Cluster profiles are determined using chi-square cross-tabulation and ANOVA with post-hoc Tukey comparison of mean scores. Second, the internal reliability of the components of the TPB model was assessed using Cronbach's alpha. Third, differences between the components of the TPB among consumer segments were assessed through independent samples *t*-tests and ANOVA. Finally, the validity of the TPB was assessed through performing linear regression analysis, first, between behavioural intention and its hypothesised antecedents (attitude, subjective norm, perceived behavioural control) and behavioural intention; and second, between behavioural intention and perceived behavioural control as hypothesised determinants of behaviour.

2. Results

2.1. Sample descriptives

Of the 245 questionnaires handed out, 240 were returned completely filled – a valid response rate of 97.9%. In the study, 45% of the cases were conducted in Belgium and 55% in Poland. The respondents who participated were 47% men and 53% women. One-third of the respondents were younger than 25 years of age; 36% were between 25 and 45 years old; and 31% of the valid cases were older than 45 years of age. Table 1 presents the characteristics of the respondents for both countries. The Belgian and Polish sub-samples do not differ significantly in terms of socio-demographic composition (age and gender, both $P > 0.10$). Therefore, both sub-samples' attitudes and behaviour towards fresh vegetables can be compared, without risk of bias from socio-demographic differences between the sub-samples.

Table 1. Demographic sample characteristics, Belgium (n=107) and Poland (n=128)

	Belgium	Poland	Pearson chi-square	P-value
Age			1.791	0.408
<25 years	31.2	35.1		
25–45 years	40.4	32.1		
>45 years	28.4	32.8		
Gender			0.51	0.822
Male	45.9	47.3		
Female	54.1	52.7		

The behaviour towards vegetable consumption was analysed in terms of frequency, amount, perceived “enjoyment” and “part of dietary habits”. Significant differences were found between nationalities ($P=0.014$), gender ($P=0.041$) and age categories ($P=0.002$) in considering vegetable consumption as a part of dietary habits. Almost 90% of the Belgians versus 75% of Poles; and 87% of women versus 76% of men strongly agree or agree that vegetable consumption is a part of their habits. About 93% of the oldest respondents (more than 45 years of age) versus 81% of the people aged 25–45 years and only 72% of the youngest respondents consider vegetable intake as a part of their dietary habits.

In response to the statement: “I would be able to enjoy my life without eating vegetables” significant differences were found between nationality ($P=0.014$) and age categories ($P=0.044$). More than 31% of Belgians versus only 13% of Poles strongly agreed or agreed that they would enjoy life without consuming vegetables. The disagreement of enjoying life without eating vegetables was stronger among the oldest age group (76%), versus middle age (60%) and the youngest (55%).

A majority of respondents claimed to consume fresh vegetables one or more times per day (58.7% of Poles; 53.4% of Belgians; $P>0.10$). A significant difference ($P=0.011$) in the frequency of vegetable intake was found between males and females. About 65% of the females consume vegetables one or more times per day, whereas only 45% of males declare a frequency of fresh vegetable intake of at least once a day. No significant differences were found between the age categories.

2.2. Beliefs related to eating fresh vegetables

Factor analysis using principal components was performed based on respondent’s scores on 10 benefit beliefs. This yielded three distinct factors, explaining 64.5% of the variance in the initial data (Table 2). The first factors can be typified as “belief in health preventative benefits” of eating fresh vegetables. The second factor refers to respondent’s “belief in hedonic benefits” of eating fresh vegetables. Factor 3 includes “beliefs in nutritional benefits”. This factor structure indicates that the main motivations for eating fresh vegetables are: health and prevention, hedonism (taste), and nutrition. Individual respondent’s factor scores have subsequently been used for cluster analysis, with the aim to obtain belief-based segments of vegetable consumers.

Table 2. Principal components analysis (PCA) of fresh vegetable benefit beliefs; varimax rotated factor loadings and % explained variance

Eating fresh vegetables ...	Factor 1 Belief in health preventative benefits	Factor 2 Belief in hedonic benefits	Factor 3 Belief in nutritional benefits
Prevents early death	0.83		
Reduces risk for cancer	0.77		
Strengthens my immune system	0.69		
Helps to quit smoking	0.68		
Makes my food tastier		0.85	
Provides pleasure when eating		0.77	
Adds variety to diet		0.76	
Supplies my body with minerals			0.86
Supplies my body with vitamins			0.86
Supplies dietary fibre			0.60
% Explained variance	24.0	20.4	20.1

2.3. Belief-based market segmentation

A three-cluster solution emerges from the cluster analysis. The profile of each cluster in terms of factor scores, size, socio-demographic and behavioural profile is presented in Table 3. The main motivation for eating fresh vegetables within cluster 1 pertains to taste. This cluster predominantly includes Belgian respondents. Almost half of the respondents belonging to this taste-oriented cluster eat fresh vegetables more than once a day. They show an overall high habitual consumption of fresh vegetables.

Cluster 2 includes predominantly young males, irrespective of nationality. They have an overall low consumption of fresh vegetables. Only one out of six of them claim to eat fresh vegetables more than once a day. Additionally, they have a significantly lower score as compared to the other two segments related to eating fresh vegetables as habit. Their main motivation for eating (some) fresh vegetables pertains to belief in nutritional benefits, despite their low appreciation of taste.

Cluster 3 is the largest segment, including 57.1% of the sample. It is a predominantly Polish and female cluster of people who eat fresh vegetables mainly for health preventative and taste reasons. Their attitudinal and behavioural profile is similar to cluster 1 in many respects, despite a significantly lower share of respondents who eat fresh vegetables more than once a day in cluster 3. It should also be noted that the Polish respondents have a significantly stronger belief in health preventative benefits as compared to Belgians (score on factor 1 is 0.25 for Polish, versus -0.31 for Belgians; $t=4.43$; $P<0.001$). Hedonic (factor 2) and nutritional (factor 3) beliefs do not differ significantly between Poles and Belgians. Figure 1 provides a two-dimensional graphic presentation of the clusters and their profiles, using health preventative benefit beliefs (factor 1) and hedonic benefit beliefs (factor 2) as discriminating axes.

Table 3. Market segmentation based on fresh vegetable benefit beliefs (factor scores from PCA); cluster profile for 3-cluster solution

	Cluster 1	Cluster 2	Cluster 3	Total sample
Factor scores; cluster centres				
F1: Health preventative benefits	-1.34	-0.18	0.58	0.00
F2: Hedonic benefits	0.48	-1.51	0.36	0.00
F3: Nutritional benefits	-0.16	0.42	-0.09	0.00
Key belief / motivation	Taste above all	Nutrition, despite low liking	Health and Taste	
Cluster size, % (n=231)	22.1	20.8	57.1	100
Socio-demographic profile				
Gender female*	52.9	37.5	59.8	53.7
Age <25 years*	25.5	50.0	30.3	33.3
Nationality Polish*	31.4	58.3	62.9	55.0
Behavioural profile				
Eating fresh vegetables is part of my dietary habits**	6.22b	5.21a	6.00b	5.86
Eating fresh vegetables more than once a day*	49.0	16.7	28.5	30.7

*: % of respondents within cluster

**.: mean score on 7-pt scale; scores with different subscript are statistically different ($P < 0.05$)

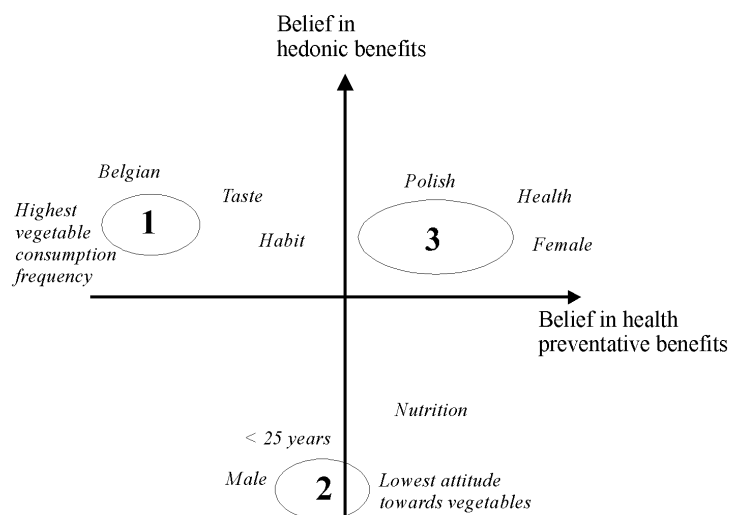


Fig. 1. Graphical qualitative presentation of the clusters and their profiles on the two most discriminating factors

2.4. Theory of Planned Behaviour

Further profiling of the segments is obtained through comparing the components of the TPB between segments. The internal reliability of the multi-item components of the TPB was assessed by Cronbach's alpha. The scales performed well for attitude, subjective norm and behavioural intention (Cronbach's alpha >0.6), hence, multi-items constructs were aggregated into single measures. The values of the Cronbach's alpha for the direct measure of perceived behavioural control (PBC) and behaviour were lower than the required 0.6, meaning that the items of the scale do not form a homogeneous measure. Consequently, separate items instead of the complete construct were used in further analyses.

The attitude towards eating fresh vegetables is highly positive for the total sample. The lowest overall attitude is seen for cluster 2. Generally, the relatively low score for subjective norm and high score for perceived behavioural control reveal that eating fresh vegetables is a strongly individual choice, particularly within cluster 1. A higher score of subjective norm, which relates to perceived social pressure, indicates a stronger influence of family members on respondents belonging to cluster 2 and cluster 3. It is plausible that parents or partners stimulate the younger males of cluster 2, whereas social responsibility towards giving the family a healthy meal including fresh vegetables may account for the higher subjective norm in cluster 3.

Table 4. Validity of the Theory of Planned Behaviour for the different clusters

	Cluster 1	Cluster 2	Cluster 3	Total sample
Components of the TPB				
Attitude towards eating vegetables*	6.63b	6.29a	6.67b	6.57
Subjective norm*	2.72a	3.32b	3.33b	3.21
Perceived behavioural control*	5.42b	4.92ab	4.66a	4.89
Behavioural intention**	3.01ab	2.67a	3.37b	3.12
Behaviour**	2.70b	2.06a	2.72b	2.58
Regression analysis				
<i>Determinants of Behavioural Intention</i>				
Attitude	0.32	0.46	0.37	0.40
Subjective norm	n.s.	n.s.	n.s.	n.s.
Perceived behavioural control	n.s.	n.s.	n.s.	n.s.
R ² adj	0.04	0.17	0.11	0.15
<i>Determinants of Behaviour</i>				
Behavioural intention	0.72	0.52	0.57	0.61
Perceived Behavioural control	0.17	n.s.	n.s.	0.10
R ² adj	0.52	0.25	0.32	0.37

*: mean score on 7-pt scale; scores with different subscript are statistically different (P<0.05)

***: mean score on 5-pt scale; scores with different subscript are statistically different (P<0.05)

n.s.: not significant at P<0.10

For the total sample, attitude emerges as the major positive determinant of behavioural intention. Despite differences in subjective norm between the clusters, social pressure does not emerge as a significant determinant of intention to eat fresh vegetables. Similarly, consumer's perceived control over their own behaviour does not influence behavioural intention towards fresh vegetables. In line with theoretical expectations, behavioural intention emerges as a significant determinant of behaviour in the strict sense. Hence, the stronger the intention to engage in fresh vegetable consumption, the more likely its performance. Furthermore, perceived behavioural control emerges as a determinant (marginally significant for the total sample) of behaviour. This denotes that higher perceived control over own behaviour positively influences fresh vegetable consumption, particularly within the hedonism-focussed segment 1.

3. Conclusions

In general, the study shows that health and prevention, hedonism, and nutrition are the three main benefit beliefs or motivations for eating fresh vegetables. This confirms previous findings from literature. Three distinct belief-based clusters emerge, which differ both in terms of socio-demographic composition, attitudes and behaviour. Identification of those clusters yields two main conclusions. First, young males, irrespective of nationality, need primary attention in future health communication aiming at increasing fresh vegetable consumption, since their attitudes and behaviour are particularly low. The key focus of communication to this target segment should be on nutritional benefits of eating fresh vegetables. Second, clear differences between Polish and Belgian respondents are discovered. Polish consumers, concentrated predominantly in cluster 3, claim a lower intake of vegetables, despite stronger health benefit beliefs. On the contrary, Belgian respondents who are concentrated predominantly in cluster 1, are characterised by a strong focus on taste and a higher consumption rate.

Investigation of the TPB stresses the primary role of attitude in determining behavioural intention. This finding about the predominant role of attitude consolidates the results obtained by STAFLEU and co-workers (1991), by POVEY and CONNER (2000) with respect to eating five portions of fruit and vegetables per day, and by LIEN and co-workers (2002) with respect to fruit and vegetable consumption among adolescents. Furthermore, behavioural intention strongly correlates with behaviour in the strict sense (consumption of fresh vegetables), which is in line with previous studies and classical consumer decision-making theories. On the other hand, perceived behavioural control was found to be a poor predictor of intention, similar as with POVEY and CONNER (2000). Contrary to previous studies, no significant impact of subjective norm (social pressure) on behavioural intention to eat fresh vegetables was found. It should be noted that previous studies reporting this link were more specific in terms of focus, i.e. compliance with "Five-a-day" in the study by POVEY and CONNER (2000), or in terms of target population, i.e. adolescents only in the study by LIEN and co-workers (2002).

Since the goodness of fit of the model explaining behavioural intention is relatively low, which was also reported previously by GODIN and KOK (1996), the validity of the TPB in the specific case of fresh vegetables may be questionable. This indicates that decision-making towards eating fresh vegetables as such is not strongly reasoned, but probably largely determined by habits. This would be in line with the hypothesis that fresh vegetables are a low-involvement good, for which habitual decision-making dominates.

Finally, potential explanations for cross-national differences may pertain to the availability and variety of tasteful fresh vegetables, particularly during wintertime, which was the period of data collection. Seasonal patterns in vegetable supply have almost completely faded away in Belgium, which does not hold to the same extent for Poland. The findings indicate that there is room for improving vegetable intake, particularly in Poland, where benefit beliefs related to health and disease prevention are especially strong as compared to Belgium. Improving the availability and variety of fresh vegetable supply is one potential structural solution. Potential barriers to be lifted in Belgium rather pertain to individual attitudes, which may require both cognitive and affective communication. Future research with data collection in different seasons and from larger, statistically representative samples is advised to further validate the findings of the current study.

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