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Diet and health: Are consumers willing to perform health behaviours?

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Abstract

The bleak health picture in Eastern Europe called for an understanding of determinants of prevention. Underpinned by the Health Belief Model and the Theory of Health Preventive Behaviour, this paper identifies key antecedents of dietary health preventive behaviour (DHPB) in a transition economy.

Health motivation, beliefs that diet can prevent disease, knowledge about nutrition and age were found significant predictors of dietary health preventive behaviour. Information acquisition behaviour was positively predicted by health motivation, education attainment and self-reported knowledge about nutrition and negatively by age. Implications for marketers and health policy makers are drawn.

Introduction

Diet –related diseases represent a key issue of policy makers in the UK. The high incidence of cardiovascular diseases (CVD) (WHO 2003), growing share of obesity particularly among children (Purvis 2004), vindicated an increased attention to health prevention. Lifestyles play a major role. It was claimed (Leather 1995) that a third of cancer can be prevented through dietary change.

Encouraging people to eat more healthy poses marketing challenges in both the UK (Andersson, Milburn and Lean 1995) and Eastern Europe (Bobak et al. 1998). Heart diseases, strokes and cancer account for 60% of the deaths in UK (ONS 2000). Such diseases typically regarded as specific to developed economies have a significant prevalence in Central and Eastern Europe (CEE) (WHO 1995, 1998). Issues such as CVD, obesity carry policy concerns in both Western Europe and CEE. Recently in the UK, more pressure was placed on the supermarkets to respond to government initiatives to decrease the amount of salt in processed foods (Brown and Walker 2004).

Problem statement and purpose of the study

The paper draws upon fieldwork carried out in Romania, a transition economy which provides a useful case study for challenges in health behaviour. The transition from a centrally planned system to a free market economy entailed a revolution of aspirations in Eastern Europe (Shultz, Belk and Ger 1994). Nevertheless, these were largely unfulfilled, as Romania's transition to a market

economy was associated with increased poverty from 7% in 1989 to 44% in 2000 (UNDP 1999, 2003), leading to an inability to acquire goods, poor nutrition (Stanculescu 1999) and a subsequent increase in morbidity and mortality. Life expectancy at birth fell slightly from 69.8 years in 1991 to 69.2 in 1998 (UNDP 2003). Mortality from most diseases has increased.

CVD represent the main cause of mortality in Romania, followed by cancer (NCS 2002). Unlike Western Europe, the prevalence of mortality from CVD increased steadily since 1960s (Cockerham 1999). The mortality rates from cancer have almost doubled in Romania over the past two decades. The deterioration in health indicators in Romania during transition (increased incidence of mortality form cardiovascular diseases) is thought to be linked to a plethora of risk factors. Lifestyle factors (diet, cigarette smoking) are thought to account for a large proportion of the disparity between life expectancy in the European Union (EU) and the CEE (Bobak and Marmot 1996).

There are thus serious reasons for understanding health behaviours, and reducing the exposure to risk factors. There is a need for understanding the determinants of dietary health preventative behaviours and to identify barriers to healthier eating practices. "Prevention" in this context is regarded as the actions related to diet (selection of food, dieting) which can reduce the likelihood of diet-related diseases.

The study oh health and resolution of health problems greatly benefits from contribution from consumer research (Moorman 2002). This paper investigates determinants of health behaviour placing a focus on diet action. Notwithstanding that the fieldwork was conducted in a transition economy, it is thought that such an analysis is relevant in the context of diet-health relationships which is a highly topical area in the UK.

This paper is therefore concerned with the identification of significant determinants of health preventative behaviours in Romania, concentrating on dietary choices. The paper pursues the following objectives: to explore determinants of dietary health preventative behaviours in Romania; to test the extent to which dimensions of the Health Belief Model (HBM) are valid in explaining the likelihood of engaging in dietary health preventative behaviours in a transition economy; to critically assess the relevance of the Dietary Health Preventive Behaviour Model in Romania.

The models of health preventative behaviour

Social cognitive models have been used to understand the health behaviours in developed economies (Rutter and Quine 2002). Health behaviours have been defined as any action undertaken by a person behaving himself to be healthy for the purpose of preventing disease or detecting it at an

asymptomatic stage" (Kasl, Cobb 1966, p.246). The focus of this paper is on self-directed diet-related health behaviours.

The research reported in this paper is based on a model of Dietary Health Preventative Behaviours derived from the HBM (Janz and Becker 1984) and the Theory of Health Preventative Behaviour (Moorman and Matulich 1993) as theoretical frameworks aimed at the understanding of health preventative behaviour.

Both the theory of health preventative behaviour and HBM aim to explain the determinants of engaging into actions that can have health implications. There are two main assumptions underpinning the HBM: 1) the subjective valuation of a particular goal; and 2) the individual's estimate of the likelihood that a given action will achieve that goal (Janz and Becker 1984). The goals can be defined in terms of the prevention of disease or improvements to one's health status or wellbeing. The main relationships of the HBM are summarised in Figure 1.

Insert Figure 1 approximately here

According to the HBM, health behaviours (Box A) are dependent upon the perceived threat of disease (Box F). The latter is the outcome of perceived susceptibility to getting a disease and the severity of consequences of suffering the particular disease (Box B). The belief in health threat can also be influenced by general health values (Taylor 2003). Perceived susceptibility describes respondent perception of risk of being exposed to health condition. Perceived severity refers to the individual's perception of the seriousness of effects associated with illness. It includes the distress caused by a disease in personal life (pain, disability) as well as social life (social relations, family life).

While barriers to preventative action (Box C) may hinder the likelihood in engaging in certain health behaviours, the cues to action (Box D) can trigger the decision-making process. Perceived benefits of preventive action (Box C) are conditioned by the belief that an individual action will reduce the perceived threat of a certain disease. Demographic and socio-psychological variables (Box E) are thought to influence the perceived threat of a disease, perceived benefits and barriers associated with preventative actions.

The health motivation (HM) is a central point in the Moorman and Matulich (1993) model. They developed a model of preventative health behaviours based on the health information acquisition behaviours and health maintenance behaviours. It was hypothesised that health behaviours are influenced by health motivation as well as by the interaction of health ability and health motivation.

HM was defined as the goal-directed arousal of consumers to engage in health preventive behaviour (MacInnis, Moorman and Jaworski 1991). Moorman (1990) linked the enduring motivation to the respondents' desire to process nutrition information in general and after exposure to a stimulus. HM was believed to be stable over time and unrelated to particular health condition (Cummings, Jette and Rosenstock 1978).

The dietary health preventative behaviour model

As highlighted in the introduction to this paper, the period during transition to a free market economy in Romania has been characterised by increasing mortality and economic hardship. For this reason it was decided to create a new model that incorporates the most relevant variables from the HBM and the health preventive behaviour model and adapt this to local conditions. The aim was to establish a model that was most likely to capture health-related behaviour in Romania. This is described as the Dietary Health Preventative Behaviour (DHPB) model, as it focuses on nutrition. In order to develop a manageable questionnaire it was necessary to be selective. Variables thought most relevant to the Romanian environment were included. The DHPB Model adopted in this study retains the perceived threat and perceived barriers to health action from the classic HBM. The following modifications from the Health Preventative Behaviour model have also been incorporated in the DHPB model:

1. This study concentrates primarily on dietary health maintenance behaviours. The health preventative behaviour was mainly focused on health maintenance behaviour with respect to diet as this was the focus of our research, namely: positive diet action; negative diet action and alcohol moderation. The items related to diet were adjusted and developed according to the Romanian environment.

2. Health ability was measured on four dimensions. These were thought the most relevant out of the seven measured by Moorman and Matulich (1993). The relationships between the variables in the DHPB model are described in Figure 2.

Insert Figure 2 approximately here

A new variable, thought significant in terms of people's motivation to pursue dietary change, was added in the model. This has been labelled "efficacy" (Box G)- measured as the strength of the respondent's beliefs that disease can be prevented through an adequate diet.

Model Variables

Each of the variables used in the model is now described.

Health Preventative Behaviour

Initially nine items related to DHPB (Box A, Figure 2) were included in the analysis guided by the theory (Moorman and Matulich 1993) of health behaviour (see Table 1, appendix 1). The DHPB scale was based upon the development of the health preventative concept as a sum of: *positive diet actions* (those aimed at increasing consumption of certain foodstuffs that are believed to have preventative properties), and *negative diet actions* (those aimed at avoiding certain foodstuffs, moderating the intake or withdrawing from certain actions) (Moorman and Matulich 1993).

All items were measured on a Likert five-point scale (1=strongly disagree; 5 = strongly agree). Several items were then added to Moorman and Matulich's scale. It was thought that the socio-economic stress generated by the transition to a free market (job insecurity, long working hours) increased the dependency of more subjects to stimulants (e.g. coffee). An item related to consumption of animal fat was thought relevant for such a scale. Animal fat consumption in the CEE tends to exceed western standards and saturated fat has been estimated at 60-70% of the fat intake (Palmer and Poledne 1998). The scale captured not only the low-fat/high-fat trade-off, but also concepts relating to dietary balance (e.g. moderation).

An exploratory principal component analysis (EFA) was conducted using SPSS version 10 (Norusis 2000). The internal consistency and item-to-total correlations were assessed (Churchill 1979) to purify the scales. Items that had an unacceptably low communality or generated cross-loadings were eliminated from the scale, consolidating the internal consistency. In all analyses only loadings above 0.40 were considered in the interpretation of factors, given the sample size (Hair et al. 1998). The loadings used in the interpretation of factors following varimax rotation are outlined. Only factors whose eigenvalues were above one were used in factor interpretation.

Kaiser-Meyer-Olkin of sampling adequacy (KMO) indicated a satisfactory fit of the method to the data (0.71).

Two items concerned with avoiding fat and confectionery products were however poorly explained in the factor solution (communality <0.40) and were thus eliminated from the scale. The conceptual meaning behind these eliminated items was encapsulated by the other items. Similar Moorman and Matulich (1993), the item related to alcohol moderation was treated as a single independent item, because, although it was not well explained in the EFA, it has relevance for marketers and health policy. The items retained in the exploratory factor analysis are highlighted in italics in table 1.

Unidimensionality was assessed using confirmatory factor analysis (CFA) in LISREL 8 (Joreskog and Sorbom 1996), recognised as a viable method for evaluating construct validity (Gounaris and Stathakopoulos 2004) within the context of theory testing. Differences in chi-square as well as goodness-of-fit indicators were evaluated. For both positive and negative DHPB items loaded positively as expected and with minimal cross-loading, indicating unidimensionality (Gerbing and Anderson 1988; Hair et al. 1998; Voss, Spangenberg and Grohmann 2003).

The predicted two-factor solution had a superior fit as indicated by the significant factor loadings ($p<.05$) and the goodness-of-fit indices ($?^2$ = 8.43; df=8; p=0.3922, RMSEA=0.011; Taka-Lewis Index (TLI) =0.997; AGFI=0.984) relative to the null model ($?^2$ = 39.83; df=9; p=0.000), which allowed items related to DHPB to be a single construct (one-factor solution). Values of RMSEA less than 0.1 are indicative of close fit of the model to the data (Browne and Cudeck 1993). Values of AGFI and TLI above 0.90 suggest adequate fits, while greater than 0.95 indicate good (Kaplan 2000). The absolute and incremental fit indices exceed the cut-off criteria recommended in the literature and their combined usage may achieve a reasonable balance between type I and type II errors (Hu and Bentler 1999).

Two factors were identified and thus used to decide which statements contributed to determine the DHPB scale. The first factor appears associated with positive dietary actions, while the second with negative dietary actions, similarly to Moorman and Matulich (1993). Positive dietary actions aim at the consumption of foods recommended by nutritionists. Negative dietary actions refer to avoiding or reducing the consumption of foods that may have a detrimental impact on health if consumed regularly. Each DHPB scale was derived as an arithmetical mean of the respondent's ratings corresponding to each of these two dimensions.

The information acquisition behaviour was measured using a single item concerned with the frequency information from reading food labels (1=almost never; 5=almost every time).

Perceived Severity of Disease

Severity (see Box B, Figure 2) was measured on a five-point scale on which respondents were asked to evaluate how disturbing were specific prompted diseases (1 = not disturbing at all; 5 = very disturbing). The likelihood of suffering a disease was measured on a five-point scale in order to maintain consistency in the measurement of model variables (1 = very unlikely to 5 = very likely). The multiplicative combination of severity and susceptibility yields the "Perceived Threat" score (Box C, Figure 2).

Five diseases were prompted as follows: high blood pressure, ulcer, liver disease, diabetes and ischaemic heart disease. They were selected because they account for the largest share in mortality (heart, cancer). At the same time, some diseases with less severe symptoms (e.g. ulcer) were also explored.

Perceived Barriers To Healthy Eating

Respondents were asked whether barriers on a list impinge on their attempts to pursue healthy diets (yes/no questions, see Box D, Figure 2). The items used for eliciting answers related to the perception of barriers to a healthier diet, were derived from the consumer behaviour literature and studies concerned with food choice (Lapallainen et al. 1997; Asp 1999). One specific item was added, namely "the pressure on my diet", as it was felt that consumers in Romania face significant budgetary constraints that impinge upon their food choices. It referred to financial constraints on dietary choices. The barriers are reported in table 2.

Insert Table 2 approximately here

Economic and psychological barriers (consumer preferences) are at the top of the list. Some of the barriers are not easy to be removed (low income). However, other barriers are more controllable by individuals or can be influenced by marketers (changes in consumer preferences).

Health Ability

Health ability (see Box E in Figure 2) was defined as "consumers resources, skills, or proficiencies for performing preventative health behaviours" (Moorman and Matulich 1993, 210). Four

dimensions describing consumers health abilities are included: consumer's education, age, income and knowledge about nutrition. The influence of each variable on DHPB is tested separately.

It was believed that nutritional knowledge and the level of education will reflect the ability of individuals to process health and diet–related information. Consumer's age influences consumer "mental and physical ability to select and implement health behaviours" (Moorman and Matulich 1993, 210). Consumer's income reflects the financial ability to implement health concerns in dietary choices.

Knowledge about health and nutrition was measured on a 12-item dichotomy true/false (T/F) answer scale. Items were carefully mixed so that the likelihood of guessing the right answer was substantially reduced. Items from Alexander and Tepper (1995) were combined with new items (Table 3). The difficulty factor refers to the proportion of correct answers in the sample.

Insert Table 3 approximately here

An important assumption of the nutrition knowledge scale is that the items used in the scale development reflect the information required by the individuals to make dietary choices (Axelson and Brinberg 1992). Therefore the scale included information about sources of nutrients, as well as recommended dietary allowances and links between diet and disease. The nutrition knowledge scale incorporated all three types of knowledge pointed out by Blaylock et al. 1999): awareness of diet and disease relationship (items 4-5), knowledge of principles of nutrition (items 7-8), knowledge of food nutrient density (items 1, 3).

It is difficult to infer healthy choices based on the score of only one of the above dimensions. Even the items on one dimension can not be easily generalised. For instance, a good knowledge about fat in the diet does not guarantee the selection of foods according to their high fiber content. Hence several dimensions may capture the various facets of nutrition knowledge.

The difficulty factor was given by the percentage of correct responses in the sample. Only the items with a difficulty factor between 25% and 75% were maintained. This ensured that the items generated an acceptable discrimination capacity. The six items retained in the analysis (outlined in italic font) provided a satisfactory coefficient of reliability: and Kuder Richardson (KR20) test of inter-item consistency for dichotomous scales KR20 = 0.63 (Lewis-Beck 1994). A score of

knowledge about nutrition was calculated for each respondent as a sum of the ratings for the six retained items.

A subjective measure of consumer nutritional knowledge was also included (1= not very knowledgeable at all; 5 = very knowledgeable). As self-reported knowledge may contain a social desirability bias (Palmer et al. 2002) it was useful to have both a self-report and objective measure of the same latent variable.

One item was related to the last school attended. An average number of years of schooling was calculated (8 = primary school; 10 = technical school; 12 = high school; 16 = university graduates). Income was evaluated based on the respondent's estimate of total household income (wages, sales of products, dividends, rents) divided by the number of household members.

Health Motivation

Health motivation was regarded as consumer willingness to engage in preventative health behaviours (see Box F, Figure 2). The original set of eight items developed by Moorman and Matulich (1993) was reduced to six after the piloting stage and discussions with health professionals (table 1, appendix 1). EFA highlighted the main components of the Health Motivation variable. The varimax rotation was selected to maximise the interpretability of factors (KMO =0.66). The communalities point out a significant proportion of variance (except the first item) of original variables explained by the complete set of derived factors. Overall, the two-factor solution explains a significant proportion of variation in the data (62%). Two factors identified are associated with HM negative actions (factor 1) and HM positive actions (factor 2). The first factor describes a passive behaviour (Hmpassive) and a focus on short-term, hedonistic behaviour, which may be accounted by personal values or a lack of awareness of health implications of dietary behaviour. The second factor is concerned with actions undertaken to prevent the onset of health problems, describing a proactive behaviour (Hmactive) (Appendix 1).

The two-factor solution generated by the EFA has been validated by the CFA. The predicted two-factor solution had a superior fit as indicated by the significant factor loadings ($p<.05$) and the goodness-of-fit indices ($?^2$ = 17.82; df=8; p=0.022; RMSEA=0.05; Taka-Lewis Index 0.971; AGFI=0.968) relative to the null model ($?^2$ = 179.55; df=9; p=0.000), which specified a single factor solution. Hence, unlike Moorman and Matulich (1993), the items were not retained as a single construct, but regarded as a two-factor solution.

The Awareness Of Diet-Health Relationships

"Efficacy" reflected the strength of the respondent's beliefs that disease can be prevented through an adequate diet (see Box G, Figure 2). It was measured on a five-point Likert scale (1 = completely disagree; 5 = completely agree). Three generic diseases were elicited: diabetes, heart and liver diseases. An overall score was calculated based on the arithmetic mean of the ratings corresponding to each disease.

Psychometric properties of constructs

A summary of the internal reliability (inter-item consistency) and convergent validity derived from the CFA of the constructs can be found in Table 4 (Appendix 2). Values of composite reliability greater than 0.7 for established scales and 0.6 for new scales are indicative of internal consistency. Values of AVE greater than 0.5 indicate convergent validity (Fornell and Larcker 1981; Nunally and Bernstein 1994). Nevertheless Mackenzie (2001) points out that one-third to two-thirds of the variance in a typical consumer research measure can be due to measurement errors. An internal consistency reliability coefficient of 0.27 to 0.87 was reported in previous studies related to health practices (Rakowski et al. 1990). Most scales with the exception of negative diet actions satisfy the minimum recommended standards. Given the marketing and health policy challenges of health behaviour, both dimensions of DHPB will be analysed.

Sample and study design

The DHPB model is investigated using consumer data. A sample size of 500 respondents from the capital of Romania (Bucharest) was targeted. The response rate was very high (about 97%) so that approximately 485 usable questionnaires were derived. A small incentive was used to enhance the willingness to participate in the survey. The sample was thought to provide a representative image of urban consumer behaviour in Romania: Bucharest accounts for over 10% of the total Romania population.

The sampling method was based on quotas with a preliminary stratification of the city into over 120 areas. These were thought to be related to income differences so that the variability in incomes (a difficult measurement task given the contribution of the shadow economy to incomes in transition economies) was indirectly accounted for by residential location. The age group and level of education completed were criteria used for quotas. Addresses were randomly selected until quotas were filled and the informants were interviewed at home.

Data were consistent with the social and demographic statistics of Bucharest according to a representative sample collected by Romanian Institute of Economic and Social Research and Polls (IRECSON 1999). Thus 31% were under 34 years old; 47% between 35 –54. The breakdown by education was: 14.5% primary school leavers; 54.5% technical or high school.

Hypotheses

The following hypotheses guided by the theory of consumer health behaviour depicted in Figure 2 are tested.

H1: Consumers with higher perceived threat of disease (Box C) will be more likely to engage in DHPB (Box A).

H2: Consumers with higher health motivation (Box F) will be more likely engage in DHPB (Box A).

H3: Consumers with stronger beliefs that diet can prevent disease (Box G) will be more likely to engage in DHPB (Box A).

H4: Consumers with higher health ability (namely income, education level, knowledge about nutrition and age) (Box E) will be more likely to engage in DHPB (Box A).

H5: Younger respondents will be less likely than older respondents to perceive a high susceptibility to disease.

Research findings

The first section attempts to outline health preventative dietary behaviour in Romania by summarising the responses to some relevant questions in the survey. This is followed by the analysis of antecedents of health behaviours with reference to the hypotheses.

Table 5 points out a low proportion of respondents who believe they are likely to suffer from diabetes, but a relatively high proportion of respondents regarding the rest of diseases. This can be linked to the concept of "optimistic bias", that is likely to deter people from taking preventative actions. Optimistic bias emerges when people believe they are less likely than other people belonging to the same age group to incur a health problem (Weinstein 1987). Consumer beliefs about risk may diverge from 'expert' opinions (Kuznesof and Brenan 2004).

Optimistic bias raises serious policy concerns as the risk of diabetes may be independent of lifestyle (e.g. a genetic predisposition). People who perceive themselves as being less susceptible to disease may be less likely to pay attention to health-related messages or take actions aiming to

prevent the risk of disease. The results corroborate other studies that highlighted low scores on risk awareness of various health behaviour in Eastern Europe (Steptoe and Wardle 1992).

Insert Table 5 approximately here

To understand the respondent's perception of severity of disease one can examine the frequency of those who perceived the disease as "severe" or "very severe" (Table 5). People's perception of risk refers to the attitudes and judgments made about risks associated with different hazards (Slovic 1992).

There is a very high perceived severity of most diseases, albeit to a less extent for blood pressure. One would expect that the perceived risk is low when the effects are known, tolerable, the damage is reversible and there is perceived control over them (Bennett 1999). Some of these features were associated with abnormal blood pressure. Nevertheless, people's perceptions about risk remain subject to the risk of distortion due to optimistic bias (Slovic, Fischhoff and Lichtenstein 1986).

A key concern in media strategies is the selection of effective channels of communications with target groups (Pickton and Broderick 2004). One item of the questionnaire explored the sources of information about healthy eating. Table 6 summarises sources of information regarding dietary guidelines used by Bucharest respondents who acknowledged that they follow a diet.

Insert Table 6

There is also a great role played by the health practitioners, social networks and mass media. As risk may be amplified by various parties involved in the communication process: opinion leaders, mass media (Renn 1991), the way signals are perceived, interpreted and filtered may change risk perceptions. Successful campaigns should involve opinion leaders such as health professionals. Their credibility is likely to enhance the effectiveness of nutrition messages.

Antecedents of health behaviours

The following tables report on the significance of characteristics of respondents on the engagement in DHPB, of perceived susceptibility to disease (table 7). "Status" is defined in terms

of whether the subject evaluations were above or below median susceptibility, and above and below median score on the DHPB scale. The sample was divided into two groups.

Insert Table 7 approximately here

Overall, all demographic variables are significantly associated with the perceived susceptibility to disease. However, the significance varies according to each particular disease. Only age is associated with dietary health preventative behaviours status; there is greater proportion of respondents with above median dietary health preventative behaviour scores among the elderly. Hence there is no evidence in support of the sixth hypothesis. Hypothesis 5 seems also to receive little support. Nevertheless, women tend to be more aware of the risk of liver disease.

Table 7 provides evidence of a significant influence of demographics on the perceived susceptibility to disease. A higher proportion of young people believe they are unlikely to experience health hazards such as blood pressure or heart disease. Thus there is partial evidence in favour of H5. The relationship between susceptibility to disease and education is equivocal. Informants with low education levels display a high susceptibility to liver disease, but low susceptibility to diabetes. Weinstein (1987) reported that optimistic bias is unrelated to age, sex, education or occupational prestige.

Multivariate Analysis

In a first stage all the variables of the DHPB model were included into a regression model to test their joint influence upon the preventative actions and test the hypotheses simultaneously. In a second stage only the variables that were statistically significant at least at the 5% level were retained in the most parsimonious model. Table 8 reports the multivariate results of the theory test. Independent variables were mean centered to reduce collinearity (Cronbach 1978). The latter was not regarded as problematic, given the variance inflation factors (Mason and Perreault 1991) and the reasonable values of correlations among independent variables (.01-.35 with most variables correlated at ?<.10). Only the significant standardised predictors using hierarchical stepwise regression models are reported.

Insert Tables 8 approximately here

The explained variation by the model is modest, as reflected by the relatively low R square, which is not surprising as the joint effects of independent variables are typically low in HBM applications (Sheeran and Abraham 1996).

In both cases the health motivation, awareness of diet-health relationships (efficacy) and self-reported knowledge about nutrition have a positive influence on the likelihood to engage in DHPB. However it is only the dimension of proactive behaviours of the health motivation which appears significant.

Respondents with higher the levels of health motivation, stronger beliefs that diet can prevent disease and higher the level of knowledge about nutrition, are more likely to perform DHPB. The frequency of engaging in health information-acquisition behaviours such as reading food labels is positively predicted by informants' health motivation (hmactive), the level of formal education and the self-evaluation of knowledge about nutrition. Age is also a predictor but the sign is negative.

Contrary to theoretical expectations, perceived threat of disease and health ability do not play a significant role in the decision to engage into DHPB. The model containing DHPB, as defined by the negative actions, was associated with a higher R square compared to the model whose dependent variable was positive dietary actions. Efficacy is a significant antecedent of both positive and negative diet actions.

Discussion

A significant share of respondents believed they are susceptible to the elicited diseases. Health promotion strategies should aim to change the judgments of health risk. The structure of message cues can impact upon perception of risk. Menon, Block and Ramanathan (2002) argued that using a list of a greater number of frequent behaviours preceding a lesser number of infrequent behaviours can increase involvement and perceived vulnerability.

No evidence in support of H1 was found. Perceived threat did not play a significant role in explaining DHPB. It has generally been found to be less significant in HBM applications (Yates 1992). Even in developed perceived threat has been regarded as a distal predictor of behaviour (Connor and Norman 1996). The susceptibility to get a disease is not a significant driver of consumer behaviour, probably because most Romanian consumers under the pressure of low-incomes tend to trade off long-term health benefits for short-term benefits (lower prices). Economic factors were reported as a significant barrier to healthy eating.

The likelihood of engaging in DHPB is greater when people are highly motivated with respect to health (H2) and there is a stronger belief that diet can prevent disease (H3).

Although evidence of a positive influence of age and knowledge about nutrition on DHPB was found, the evidence in support of H4 remains mixed. The informants' income and education attainment were not significant predictors in explaining the variability in DHPB. Nevertheless the respondent's level of education positively influenced the information acquisition behaviours.

Health motivation emerges as the most significant predictor of health information acquisition and health preventive behaviour. The motivation to engage in healthful behaviour was found a significant determinant in the likelihood to make lifestyle changes (Ferrini, Edelstein and Barrett-Connor 1994).

Surprisingly no significant gender-related differences in terms of the likelihood of engaging in DHPB were found. There is an expectation that women are more health-conscious and interested in health issues (Rakowski et al. 1990). The barriers that do not allow women to engage more in DHPB need to be further explored.

Among demographic variables only age was significantly associated with respondents' status according to perceived susceptibility to disease and DHPB. Younger respondents believe they are less likely to suffer heart disease and high blood pressure. The evidence in support of H5 is nevertheless limited to these two prompted diseases. This study partly corroborates with previous research which pointed out that adolescents may be less realistic about the future health problems (Johnson, McCaul and Klein 2002).

Conclusions and policy implications

Drawing from the marketing and perceived risk literature, this article sought to identify predictors of dietary health preventative behaviour. Respondent's health motivation (positive actions), efficacy, knowledge about nutrition and age were significant positive predictors of DHPB as expected. The information acquisition behaviour was positively predicted by health motivation, education, self-reported knowledge about nutrition and negatively by age. The role of income in influencing DHPB remains controversial. Although economic factors appear on the top of perceived barriers to healthier eating, the estimate of income in the regression model was

insignificant. It is not excluded that many high-income earners are not engaged in DHPB to the extent noticeable in developed countries, given that the income was acquired in a relatively short period of time. However, there is evidence that low-income earners claim that economic barriers impinge upon their ability to eat healthier.

Nutrition education campaigns had a mixed success (Menon, Block and Ramanathan 2002) in shaping consumer's dietary choices. This study adds further support to the need of targeting in elaborating nutrition campaigns.

Two implications for social marketing emerge. In terms of message delivery, the use of health professionals can be effective strategy in endorsing media strategies and health policy campaigns.

In terms of message content, key themes in campaigns may include sources of fat and dietary and nutrient requirements. It is not surprising that knowledge of such issues is rather weak in a country whose nutrition messages in the communist period were underpinned by a disguise of the food shortage (Petrovici and Ritson 2000).

Different marketing strategies may be used to encouraging healthy eating habits: increasing awareness of preventive properties of foods, improve the knowledge about nutrition.

A large proportion informants who believe they are not at risk of disease has been pointed out. As self-positive bias hinders message processing (Weinstein 1987; Menon, Block and Ramanathan 2002), greater effort should be placed in media strategies aimed at changing people's perceptions about hazards targeted at this group (predominantly young subjects with low education levels).

Only the self-reported measure of nutrition knowledge significantly influenced the frequency of reading food labels and the standardised coefficients predicting DHPB were rather modest. There is little agreement over the role of nutrition knowledge in health prevention. Knowledge about diet is not necessarily translated into healthier choices, as factors such as strong preferences for unhealthy foods (Lapallainen et al. 1997) may inhibit consumer choices.

If the knowledge about nutrition of the head of the household (responsible for the food purchases) is poor, then the adverse effects on diet will be experienced by almost all family members. Family preferences influence food choice in Romania (Petrovici, Ritson and Ness forthcoming). Media campaigns for healthy eating may be oriented towards the family rather than individuals, given their social and economic vulnerability (McLean 1987). Tailored nutrition messages may be effective in changing food practices (Brinberg and Axelson 2002).

The study provides insights for future campaigns concerned with promoting healthy eating. Educational campaigns may therefore consider youth and subjects with low levels of education and knowledge about nutrition as a primary targets. Marketing campaigns promoting healthier dietary choices (e.g. low-fat foods) in this region can target consumers with high levels of health motivation and education. Nutrition information on food labels are more likely to receive interest from young and highly educated consumers. The latter are also among more likely to be "new-comers", and "winners" in terms of socio-styles developed by FESSEL-GfK (1997), concerned about body image and willing to adopt more frequently new products.

Drawing from the UK experience of healthy eating campaigns, there is scope for both increasing the awareness of links between health, wellbeing and specific foods. Such campaigns can contribute to narrowing the gap between Eastern and Western Europe. Steptoe and Wardle (2001) reported a lack of information about health behaviours and a low awareness of the relationships between lifestyle factors and risk of CVD in Eastern Europe compared to Western Europe.

Nevertheless one should consider that perceived threat of disease did not impact significantly on DHPB. Therefore health-related messages stressing perceived vulnerability may not be effective. It has been reported that risk acceptability may play a moderating role (Rindfleisch and Crocket 1999) in risk perceptions. Positive campaigns focused on benefits of dietary change (what should be eaten) may be more suitable, particularly in the early stages of behavioural change (Ling and Horwath 2001). There is scope for improving consumer knowledge about dietary fat and cholesterol.

Limitations and future research

Although most scales had a satisfactory internal consistency, the negative actions dimension of the DHPB scale had a suboptimal alpha. Caution is recommended when interpreting the results. Further research can refine the reliability of the scale by extending the health maintenance behaviours to include life balancing behaviours and non-dietary behaviour. The explained variation in the regression models was rather low but compatible with other HBM applications (Moorman and Matulich 1993; Sheeran and Abraham 1996). This can be linked to the general caveats of HBM which does not include factors such as self-efficacy (perceived control over performing the behaviour) or social pressure variables (Rutter and Quine 2001).

Given the influence of personality traits (Taylor 1991) and cultural values on health behaviour (Connor and Norman 1996) and prevalent values such as fatalism (Vulcanescu 1991) which can

encourage passive behaviours relative to hazards in Romanian culture, the role of self-efficacy deserves future attention. Differences between predictors in Romania and other emerging economies in CEE may disentangle the role of micro factors such as psychological from macro cultural, social, and economic factors. Additional insights on health behaviour can be achieved by incorporating variables such as perceived benefits to preventive action and behavioural control (Rutter and Qyne 2002), consumer attitudes and past behaviour (Fishbein et al. 2001). Other factors such as the accessibility of medical care and attitudes to health care (Conner and Norman 1996) may be particularly relevant in explaining the propensity to perform health behaviour in CEE, given that impact of income is probably disguised by the biased reporting of income in this region.

Appendix 1

Table 1. A summary of selective study construct measures

Construct	**Items used**
Dietary Health Preventive Behaviour	Positive actions *I try to consume a lot of fruit and vegetables* *I choose products rich in fiber* *I often choose products with low animal fat content* Negative actions *I try to eat as little salt as possible* *I try to avoid stimulants (coffee, cola)* *I try to have a balanced diet* I try to avoid confectionery products. I do not eat some foods because they make me fat. *I try to consume alcohol with moderation*
Health motivation	Proactive behaviour I am concerned about health hazards I try to prevent health problems Passive behaviour I do not change my behaviour until I do have a health problem. I'd rather enjoy life than avoiding exposing myself to all health hazards. I don't worry about health hazards until there appear diseases that become a problem. I am not going to worry about all the problems. There are many problems that can hurt you these days.

Table 2. Percentage of respondents who reported barriers to healthier eating practices

	% of respondents
It is hard to give up to the food you like	78
High price of healthy food	78
Pressure on my budget	70
Healthy food not available in stores	40
Lack of time	34
Nutritionists change their opinions	30
Lack of knowledge about healthy eating	30
Weak endowment with kitchen equipment	29
Lack of understanding of family members	22

Source: own calculations

Table 3. The nutrition knowledge scale

Knowledge about health and nutrition	Difficulty factor (% of respondents answering correctly)
Whole milk is a better source of calcium than skimmed milk. F	39.4
Removing the skin from chicken reduces the fat content. T	68.8
Eating more bread helps to increase protein in the diet. F	49.2
Any type of fat may damage the health. F	39.6
A high intake of salt may increase blood pressure. T	87.7
Butter contains more cholesterol than margarine. T	87.9
The daily calorie intake should not exceed 3200. T	70.0
No more than a third of calories should come from fat. T	58.6
White bread is more nutritious than wholemeal bread. F	87.8
Soya beans are a good source of proteins. T	80.1
The speed of our eating affects health. T	97.1
Cholesterol is found only in foods containing fat or oil. F	22.1

Source: authors survey data

Appendix 2

Table 4. Psychometric properties of constructs

Construct	Items	Mean	SD	Reliability diagnosis	AVE
A. Health behaviours					
Label information acquisition	1	3.9	1.1	…	…
Positive diet action	3	3.6	0.7	0.6	0.34
Negative diet action	3	3.4	0.7	0.5	0.25
Alcohol moderation	1	3.6	1.2	…	…
B. Health motivation					
Proactive action	2	3.7	0.7	0.78	0.65
Passive behaviour *	4	2.5	0.7	0.71	0.39
C. Health ability characteristics					
Nutrition knowledge scale	6	…	…	…	…
Self-reported nutrition knowledge		3.4	0.9		
Education	1	12.5	2.7	…	…
Age	1	43.4	15.1	…	…
Income (sterling pounds)	1	77.6	68.3	…	…
D. Perceived threat of disease	5	9.9	4.8	0.83	0.49
E. Efficacy	3	4.1	0.6	0.86	0.68

NOTE: The composite or construct reliability is evaluated based on Cronbach's alpha for continuous variables: $(S?_i)^2 / (S?_i)^2 + (Sv[d_i])$. The convergent validity is evaluated using the average variance extracted: AVE = $(S?_i^2) (S?_i^2) + (Sv[d_i])$; where $?_I$ =completely standardised factor loading for item I; $Sv[d_i]$ = completely standardised error variance for item I.

*) Passive behaviour: the scale values were reversed so that high scores reflect high levels of health motivation.

Source: own calculations

Table 5. Perceived susceptibility and severity associated with elicited diseases

	Susceptibility (% of subjects)	**Severity (% of subjects)**
High blood pressure	23	82
Ulcer	19	90
Liver disease	22	92
Diabetes	11	88
Ischaemic heart disease	21	92

Source: own calculations

Table 6. Sources of information regarding healthy eating

	% of subjects		% of subjects
Large audience medical literature	3.7	General practitioner	37.3
Non-conventional medical literature	13.3	Friends, magazines	45.7

Source: authors survey data.

Table 7. Demographic predictors of DHPB (chi-square statistics)

	Age	**Gender**	**Education**
DHPB status – positive actions	9.34**	0.04	1.73
DHPB status – negative actions	16.72**	9.47**	2.07
Perceived susceptibility to disease			
Blood pressure	7.47*	0.74	3.87
Liver diseases	1.92	3.87*	10.58**
Diabetes	0.95	0.71	9.96**
Ischaemic heart disease	5.91*	0.40	6.56

Note: * $p < 0.05$; ** $p < 0.01$.

Source: Own calculations.

Table 8. Hierarchical stepwise regression analysis of antecedents of health behaviours

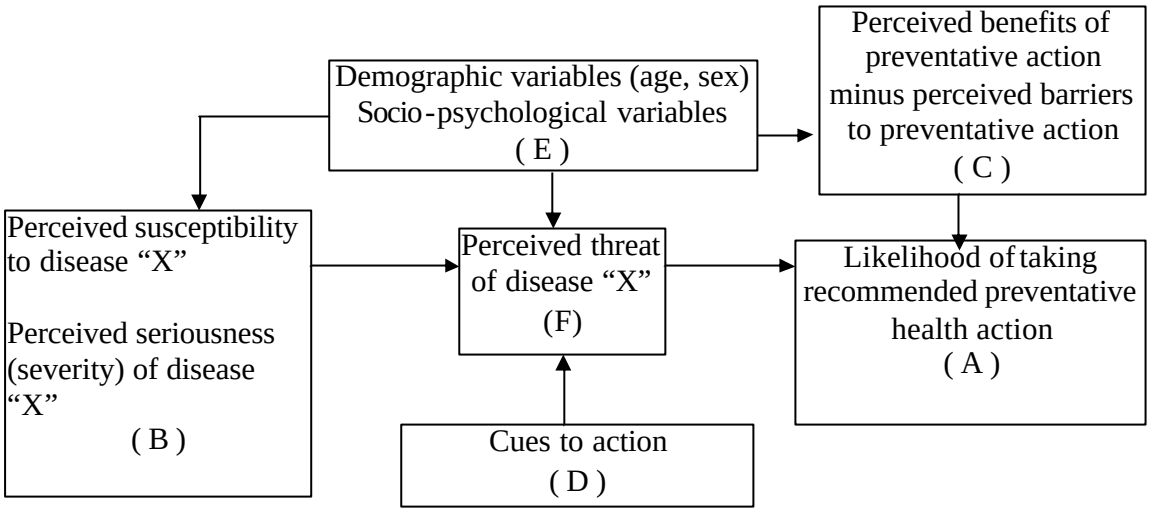
Hypothesis and dependent health behaviours	Significant predictor	Beta	t-Value
Consumers with higher health motivation levels will be more likely engage in DHPB than will consumers with lower health motivation levels.			
Posdiet	Hmactive	.176	3.69**
Posdiet	Hmpassive	.08	1.58
Negdiet	Hmactive	.25	5.54**
Alcohol	Hmactive	.12	2.63**
Readlabel	Hmactive	.16	3.68**
Consumers with higher efficacy will be more likely to Engage in DHPB than will consumers with weaker efficacy.			
Posdiet	Efficacy	.09	1.85+
Negdiet	Efficacy	.18	3.89**
Consumers with higher education levels will be more likely to engage in DHPB than will consumers with lower education levels.			
Readlabel	Educate	.14	3.12**
Consumers with higher levels of knowledge about nutrition will be more likely to engage in DHPB than will consumers with lower levels of knowledge about nutrition.			
Posdiet	KNO	.09	1.94*
Alcohol	KNO	.09	1.87+
Alcohol	KNO x HMotive	-.10	-2.17*
Readlabel	KNS	0.32	7.14**
Older consumers will be more likely than younger Consumers to engage in DHPB.			
Negdiet	Age	.16	3.55**
Readlabel	Age	-.09	-2.01*

Note: Only significant standardised predictors are reported. All univariate tests are significant: Posdiet (R^2=.06; F=8.2**); Negdiet (R^2=.15; F=24.8**); Alcohol (R^2=.03; F=5.06**); Readlabel (R^2=.175; F=23.31**).

** p < .01; * p < .05; + p< .10

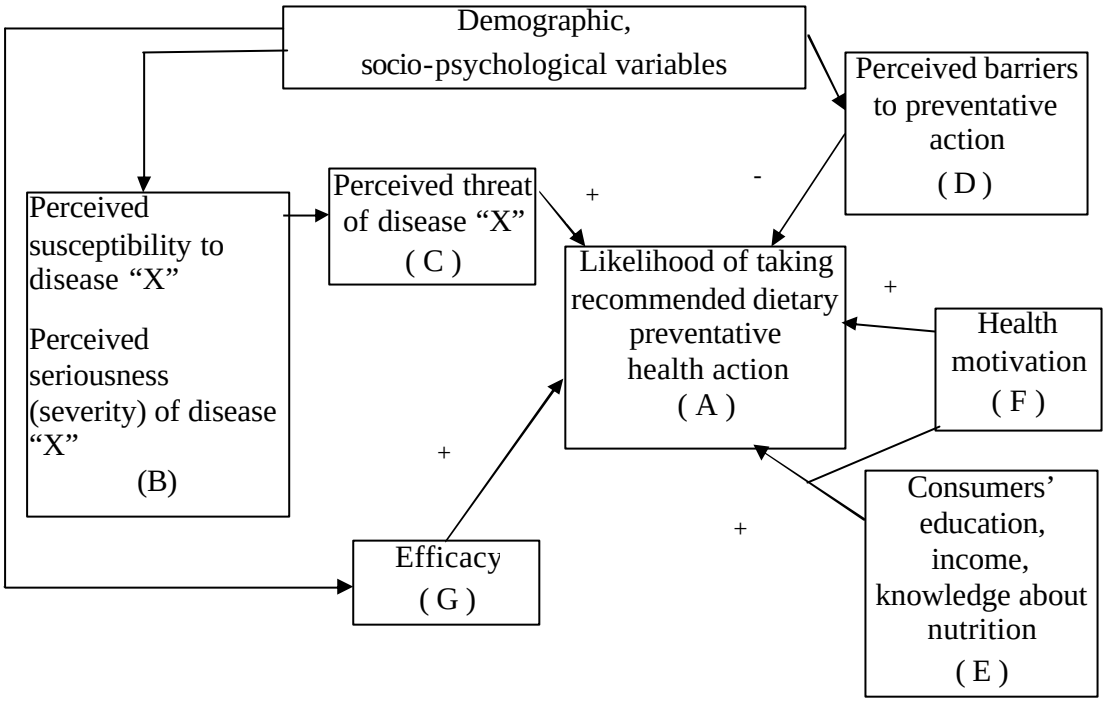
Source: derived from Bucharest survey

Figure 1. The classic Health Belief Model



Source: Janz and Becker (1984)

Figure 2. The Romanian Dietary Health Preventative Behaviour Model



Source: Adapted from Janz and Becker (1984) and Moorman and Matulich (1993)

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