Determinants of food choice in a transitional economy: Insights from the Theory of Reasoned Action

Abstract

This paper draws upon a consumer survey carried out in Bucharest (Romania) to explore determinants of food choice in a transition economy. An adapted version of the Theory of Reasoned Action was developed. This included attitude toward intention, habit and preference as independent variables. The structural equations modelling carried out in 'Analysis of MOment Structures' AMOS showed a significant positive influence of all variables. Similar to other studies conducted in European Union (EU) countries (Saba, Di Natale, 1998) habit outweighed the other variables. The study emphasises the heterogeneity of consumer beliefs about food. Furthermore it was suggested that there is scope for non-economic variables in explaining food choices and consumer behaviour in these emerging economies, though the influence of these variables may be still limited relative the economic factors. Further research on special groups is required to quantify the influence of non-economic factors and compare the results estimated in Romania with other countries which are candidates to EU accession.

Key words: Theory of Reasoned Action, food choice, transition economy

1. Introduction

In low income countries, economic determinants (price, income) are critical in shaping food choice (Steenkamp, 1997). Nevertheless, the major social and economic transformations which have occurred in transition economies (privatisation, liberalisation of food markets, branding, change of retail scene) have also had an impact. The growing income inequality in Central and Eastern European countries (CEECs) has created a new segment of high-income consumers with behaviour sometimes similar to the "average" consumer in the EU: i.e. significant purchases from supermarkets, awareness of quality and other non-economic aspects in selecting food, including health and nutrition. For example, Brosig and Ratinger (1999) suggested the presence of shifts in demand curves for food in the Czech Republic associated with concerns about health. Moon et al. (1999) explored the awareness of nutrition concepts among Bulgarians and found significant concerns about nutritional attributes such as sodium, sugar and fat content.

As Henson and Traill (1991) anticipated that there may in fact be more similarities between high-income consumers in the CEECs and the middle class in the EU, than within the developed economies themselves. It can be argued that the emerging differentiation of food markets was welcome after the decades of forced equalisation of incomes. Nutritional concerns are expected to grow in significance.

Despite these fragmented studies on consumer behaviour in CEECs against a background of substantial transformations due to readjustments in expenditure patterns, there has been no comprehensive attempt to test theoretical models of consumer behaviour. The studies on CEECs have been largely concerned with the estimation of the significance of economic factors (prices, incomes).

This paper reports on a first step in applying the theory of reasoned action in a transitional economy. Thus the paper is concerned with the calibration of the Theory of Reasoned Action (TRA) as a theoretical framework aimed at the understanding of food choice. Specifically the paper pursues the following objectives:

- to identify main consumer beliefs about food in Bucharest; to explore the relationships between consumer attitudes, habit, beliefs and behavioural intention; to evaluate the

significance of non-economic factors in food choice; to test the extent to which the TRA is valid in explaining the consumption intention in a transition economy; and to compare the estimates with those reported in the literature.
The paper is structured as follows. The next section presents an overview of food consumption trends throughout transition in Romania. The methodology in terms of data collection is described in section 3. Section 4 describes TRA in detail. Section 5 contains the main findings based on data from a consumer survey. It is divided as follows: the exploratory analysis of consumer beliefs about food (section 5.1); bivariate analysis of variables based on the extended TRA (section 5.2); following a theoretical account of the Structural Equation Modelling (SEM) (5.3.1) there is an estimation of path coefficients based on the SEM (section 5.3.2). Section 6 summarises implications of TRA for understanding consumer behaviour in emerging economies.

2. Food consumption patterns in Romania

Food consumption patterns in Romania since 1990 were in part predictable. As Blandford (1986) pointed out, there is a proportional relationship between consumer income and calorific intake. The reduction of real incomes by a third between 1990 and 1999 was associated with a fall in the average calorific intake over the same period from 3038 to 2644 (Food and Agriculture Organisation of the United Nations –FAO, 2000; National Commission for Statistics - NCS, 2000). Table 1 outlines changes in per capita food consumption based on a comparable methodology, (the integrated household survey. This replaced the earlier household budget survey which overlooked households headed by unemployed and employees, whose significance grew during liberalisation.

Table 1. Average Per Capita Food Consumption in Romania
kg per person per year unless otherwise stated

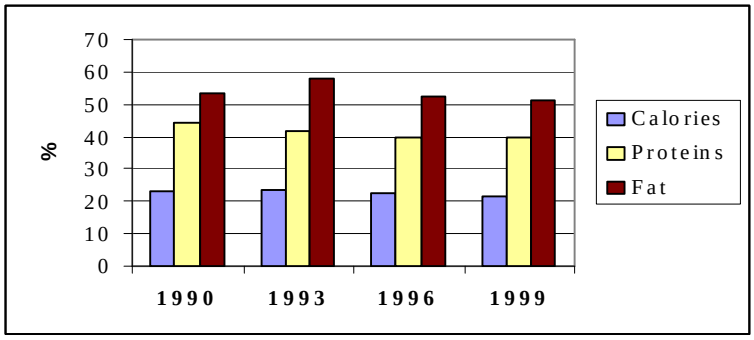
	1995	**1996**	**1997**	***1998***	***1999***	***1999 as a % of 1995***
Cereal products	170.9	164.3	164.6	165.4	164.3	96
Meat and meat products	45.4	40.9	39.3	39	40.2	89
Fish and fish products	0.4	0.277	0.255	0.306	0.336	84
Cheese and cream	94.1	80	79.8	79	81.2	86
Edible oil (litres)	16.7	15.7	15.8	16.5	16.9	101
Eggs (no)	168	164.3	169.4	175.9	180.5	107
Sugar	11.6	10.8	10.8	11.2	11.2	97
Potatoes	49.1	49.3	54	52.2	53.8	110
Vegetables	93.2	91.2	86.5	90.6	95.5	102
Fruit	25.7	27.5	25.7	26.5	22.3	87
Alcoholic beverages (litres)	2.48	2.501	2.45	2.413	2.329	94
Non-Alcoholic beverages (litres)	1.03	0.93	0.91	1.13	1.28	124

Source: NCS (1997, 1998, 2000)

One can notice significant changes in patterns of food consumption, for instance, the decline in the average consumption of fruit, meat and dairy products at the expense of eggs, potatoes and non-alcoholic beverages. The reduction in the real incomes contributed to these patterns, as underlined by the diminishing contribution of the more expensive animal products to the calorie, protein and fat intake (Figure 1).

Figure 1. Trends in nutrient intake in Romania, 1990-1999

Contribution of animal products (%)



Source: NCS (1996, 2000)

Against a background of severe changes in food consumption patterns a legitimate research question is related to the determinants of food choice. According to the consumer survey carried out in Bucharest (see Section 3 for details) quality aspects, family preferences, the wish to eat healthy were relatively highly rated by respondents among perceived factors impacting on their choices. These are compared to data for EU countries (Table 2).

Table 2. Percentage of respondents selecting factors perceived as important in their food choices

Country	N*	Quality/ Freshness	Price	Taste	Healthy eating	Family preferences
Austria	867	90	54	25	50	32
Belgium	800	76	34	46	37	29
Denmark	1000	64	39	29	48	22
Finland	971	67	62	41	40	17
France	970	77	57	42	25	21
Germany	1231	76	40	31	31	29
Greece	1001	75	18	47	32	38
Ireland	1009	49	30	45	35	36
Italy	1019	84	29	40	25	36
Luxembourg	507	68	18	49	24	18
Netherlands	974	73	36	41	28	36
Portugal	1012	66	38	40	34	24
Spain	1009	80	52	22	32	26
Sweden	1000	73	59	37	30	31
UK	961	59	43	49	40	20
EU-average	-	74	43	38	32	29
Romania	470	80,7	55,9	27,5	24,4	37,1

Source: Lappalainen et al. (1997) and own calculations; Note: 1 - Sample size.

Thus, it is suggested that although economic factors largely influenced food consumption patterns in the transitional economies (see Petrovici, Ritson, 2000), non-economic factors are also present in consumer choices. For example within the "Flora research project" it was found that 44% of Czechs reported major health concerns (Henson, Trail, 1991). It is the role of these non-economic factors in predicting consumer intentions in a transition economy that this paper explores, drawing on a survey of food consumers in Romania.

3. Methodology of the survey

Subjects and procedures

A sample size of 500 respondents from the capital of Romania (Bucharest) was targeted. The response rate was very high (about 97%): only 3% of the people approached declined the doorstep interview. Consequently approximately 485 usable questionnaires were derived. The sample was thought to provide a representative image of urban consumer behaviour, given that Bucharest accounts for over 10% of the total Romania population. The sample size was also thought adequate for modelling a set of 18 variables within the TRA framework. In order to obtain robust estimates it is necessary to ensure at least 20 observations per variable (see Hair et al., 1995).

The survey was carried out by the Romanian Institute of Economic and Social Research and Polls (IRECSON). The sampling method was based on quotas with a preliminary stratification of the city in approximately 120 residential areas. These were thought to be related with 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. The statistics of Bucharest were available for a large scale (n=2000) unpublished household survey carried out by IRECSON in 1998/1999. Data were consistent with the social and demographic statistics of Bucharest. Thus about 30% had a college degree, 47% were aged 35-54 years and 21% were above 55 years.

Quality control standards were imposed on interviewers. The selection of respondents based on convenience was restricted by a random selection of addresses. The fieldwork was carried out during April - June 2000 after a preliminary testing of the questionnaire on a pilot sample of 30 consumers.

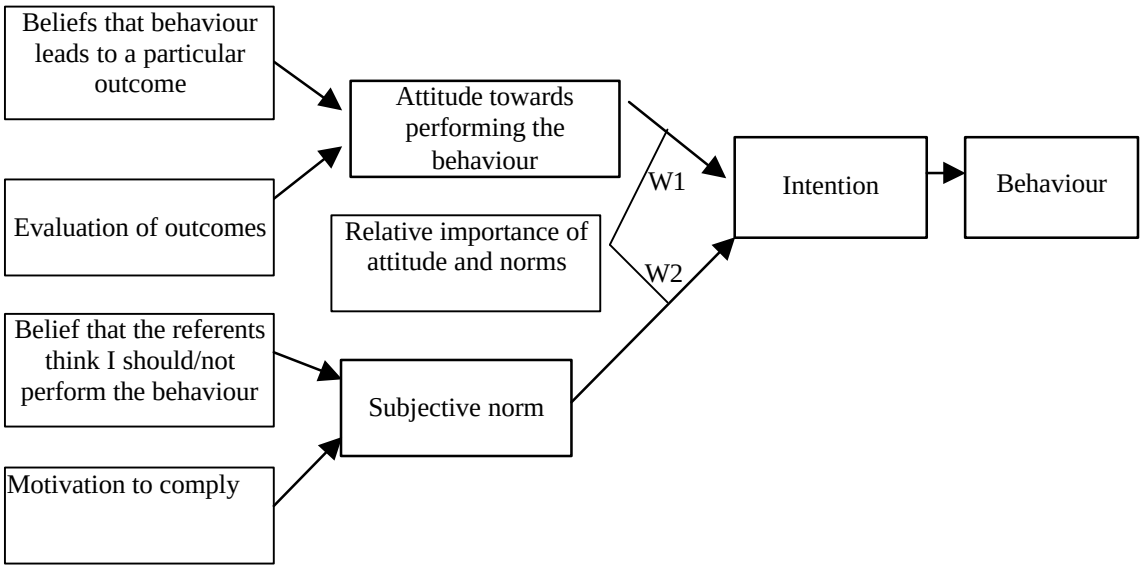
4. Theoretical background

4.1. The Theory of Reasoned Action

The TRA draws upon the social psychology literature. A recent extension of the TRA is the theory of planned behaviour that incorporates perceived behavioural control.
Areas of application of the TRA include political behaviour (voting intentions) and social behaviour (family planning, hormone replacement therapy) (Ajzen, Fishbein, 1980; Quine, Rubin, 1997). In the last two decades several applications have been developed in the area of food choice. Studies aimed to predict consumption of sweet, salty and fatty foods (Tuorila, Pangborn, 1988a), chips (Towler, Shepherd, 1991/1992), cheese (DiNatale, Saba, 1997), fats and oils (Saba, Di Natale, 1998).

The essence of the TRA is that one's intention to perform a behavior is a latent variable that depends on the attitude towards performing the behavior and subjective norm (i.e. the perceived social pressure to carry out a particular behaviour such as purchasing specific food) (see Diagram 1). TRA takes into account non-economic factors stressed by conventional economic models. Unlike many previous models the TRA has predictive as well as explicative power and provides valuable insights for understanding food choices. According to the theory of planned behaviour, the likelihood of a person's behaviour is dependent on a rational decision-making process.

Diagram 1. The Theory of Reasoned Action



Source: Ajzen and Fishbein (1975), (1980)

The stronger one's attitude towards performing the behaviour, the more intense the pressure to comply with purchasing preferences of referents; and the more entrenched habit, the stronger the intention to perform the behaviour will be. The strength of the relationships depends on the relative importance of attitude and normative components.

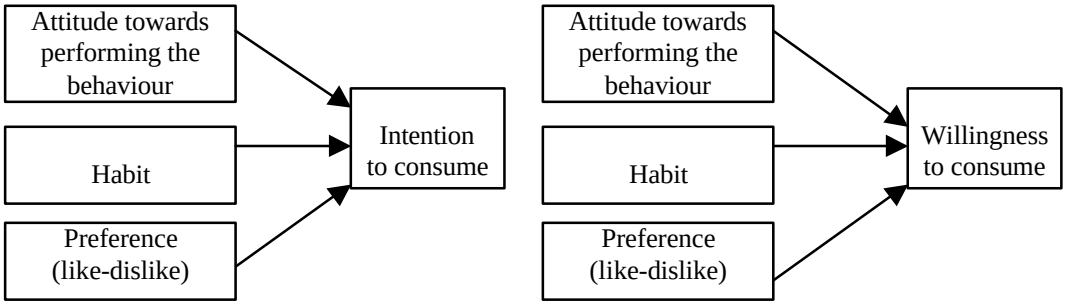
The relationship between intention and behaviour is dependent on moderating variables such as the direct experience with the attitude object, the occurrence of unforeseen events and the possession of skills required to perform the behaviour (Ajzen, Fishbein, 1980).

Habit has been successfully incorporated into the TRA (see Saba and Di Natale, 1998). It can be argued that this counteracts the criticism that the theory neglects the unconscious aspects of personality, provided that one regards habit as an automatic behaviour driven by an unconscious component. Thus one can also discuss habitual actions rather than reasoned actions. The importance of habit is high in the consumption of food products, given that, unlike durable goods, purchase decisions are characterised by high-frequency of purchase and low-involvement of consumer into the decision making process (Shepherd, 1990).

4.2. Extensions to the original TRA

In the research design reported here, there are two extensions to the original TRA.

Diagram 2. The Modified Theory of Reasoned Action



Source: Adapted from Ajzen and Fishbein (1975), (1980) and Saba and DiNatale (1998)

First, habit was included and subjective norm was not included. It was thought that subjective norm may not play a significant role in a changing environment where social models are in a process of change such as in transition economies. The pressure to comply with standard norms is less obvious for low-involvement products that do not have a strong symbolic association (e.g. eggs). Indeed, few respondents in the survey (9%) reported

buying food frequently because of the pressure to comply with referents. Subjective norm was not reported a significant predictor of consumption of food with high fat content (Shepherd, Stockley, 1985, 1987). In contrast habit was reported the most significant predictor of consumption of fats and oils (Saba and DiNatale, 1998).
One would expect a differentiated importance of habit and attitude across food groups. Therefore six representative food products for the Romanian diet were observed as follows: butter, margarine, milk, eggs, fruit and meat. These products accounted for 42% of household food expenditure in Romania (NCS, 1997).
Second, with regard to the skills required to perform the behaviour, a concept was added to account for the ability to perform that behaviour. The willingness to consume was thought to reflect intentions under no economic restrictions on households. Note that frustrations related to the incapacity to access food products included in this study were reported (meat, eggs, Stanculescu, 1999). Thus a second set of equations was specified with "willingness to consume" as an endogenous variable. This variable was thought to allow a more clear demarcation of non-economic factors on food choice.

4.2.1 Survey instrument

The multidimensional questionnaire included the following sections.
Demographic and economic information: age, level of completed education, height, weight, household income and expenditure and secondary sources of income.
Attitudes, intentions and beliefs about six specific foods: meat, eggs, fruit, butter, margarine, milk. The items were collected in order to calibrate relationships based on the TRA (see following sections for a detailed description). Literature reports bipolar semantic scales – "good-bad" attached to the statement "consuming X is for you" (see Eagly, Chaiken, 1993).
The attitude to intention was measured on a five point semantic differential consisting of a set of bipolar adjective scales ranging from harmful to beneficial. This was placed after each of the following statements: "Consuming "X" is for your family …". The latter phrasing took into account cultural issues in consumer behavior, for example, the significant influence of family in social life in Romania, reflected by the high rating of family preferences as a perceived factor of influence on food choice.
The evaluation of outcomes was based on a seven-point scale (1-not important at all, 7 = very important). Preference was measured on a five-point scale ranging from "not like at all" to "like very much".
The literature reports mixed results with respect to the relationship between liking and attitudes. These two variables are not as positively associated as one may have expected. Thus, high liking but negative attitudes were found for ice-cream and chocolate, whereas overall dislike and positive attitudes were reported for milk (Tuorila, Pangborn, 1988a, b). Nevertheless "liking" was a strong predictor of "intention".
Habit was measured by consumer rating of the statement "I consume "X' because I used to eat it together with my family". It can be viewed as a measure of qualitative habit (see Tuorila and Pangborn, 1988a).
Intentions regarding food consumption were measured similarly with attitudes. The intention to consume was measured on a five-point scale concerned with the likelihood to consume each of the selected six products during the week following the observation period (1=extremely unlikely; 5 = extremely likely). Thus intention was measured with regards to future rather than past behaviour. One can argue that it is more relevant to measure future and not past behavior to test relationships based on the TRA. However, Tuorila, Kramer, Cardelo (1997) found that the explanatory power of past consumption may exceed that of intentions regarding future food consumption.

5. Main findings

5.1. Exploratory analysis of Consumer beliefs

This section reports on the results of applying factor analysis to the consumer beliefs about foods (generated by consumer beliefs that the observed foods have specific attributes and the evaluation of these attributes in terms of importance scores). The aim was to identify whether these beliefs are structured according to underlying dimensions (themes of consumer concern in this case). The rotated component matrix and goodness-of-fit of factor solution for each of the six food products are reported.

In order to explore whether consumer beliefs about the attributes of the six foods investigated are homogeneous, the factor analysis (FA) (principal components method) was adopted. The purpose was to identify the main dimensions of consumer beliefs related to the foods examined.

There was a very good fit of the model to the data according to Kaiser-Meyer-Olkin Measure of Sampling Adequacy (above 0.78) and Bartlett's test of sphericity for all products (Approx. Chi-Square: $p = 0.000$). The factor solution is summarised in Table 3-8 (Appendix 1). There was a rotation of the principal components plan based on varimax method.

Margarine. According to Kaiser rule, three components were derived. The magnitude of loadings coefficients enabled their interpretation. The items with high loadings were used in assigning the labelling to the factor. This approach was adopted for all products. The dimensions identified for margarine were as follows: 1 - Beliefs about health; 2 - Beliefs about price/ convenience; 3 - Beliefs on gaining weight. This approach of identifying factors based on the examination of loadings coefficients was also used for the other products (see Hair et al., 1995). The dimensions explain altogether 65% of the variation in the data set. The variation in the items explained by the three-factor solution ranged from 57% in the case of calcium to 74% for cholesterol.

Milk. According to Kaiser rule three components were derived as follows: 1 - Beliefs about health/quality; 2 - Beliefs about price/ convenience; 3 - Beliefs on gaining weight (Table 4). These explain altogether 64% of the variation in the data set. The variation in the items explained by the three-factor solution ranged from 54% in the case of convenience –related attributes to 73% for cholesterol.

Butter. Likewise for milk, three components were derived as follows (see Table 5): 1 - Beliefs about health/quality; 2 - Beliefs on gaining weight; 3 - Beliefs about price/ convenience. These explain altogether 63% of the variation in the data set. The variation in the items explained by the three-factor solution ranged from 52% in the case of "to get vitamins" to 71% for cholesterol.

Eggs. Only two components had an eigen value above one (see Table 6): 1 - Beliefs about nutrients; 2 - Beliefs on gaining weight. These explain altogether a low variation (49%) in the data set relative to the previous cases.

Meat. The two-factor solution explains about half of the variation in the data set (Table 7). The components may be labelled as follows: 1 – Beliefs about nutrients; 2 - Beliefs on gaining weight. The beliefs about prices and convenience are not well explained by the factor solution according to the communalities.

Fruit. The components may be labelled as follows: 1 – Beliefs about nutrients; Beliefs about health 3 - Beliefs on gaining weight (Table 8).

In addition, as with meat, the beliefs about prices and convenience are poorly explained by the factor solution. This may be due to the large heterogeneity of these two food groups (e.g. many different items with different prices are part of the same group). This may also suggest that convenience is not an issue in fruit and meat consumption.

Overall, the factor analysis has underlined that consumer beliefs about foods are not homogeneous, but tend to be structured in key dimensions. One can regard these dimensions as themes of consumer concern or conceptualisation and rationalisation of food choices. This approach has been adopted in other studies (Saba, DiNatale, 1998). Beliefs related to health and weight were reported by Tuorila and Pangborn (1988b).
The beliefs identified were related to nutrients, health, quality, weight control and convenience. Except for meat and eggs, the variation in the variables was well explained by the factor solution. In all cases there has been a good fit of the data to the model. Hence it is possible to use the underlying dimensions of consumer beliefs identified through FA as dependent variables in order to explain their relationship with consumer intentions and other variables from the TRA.

5.2. Determinants of food choice based on the TRA

The Tables 9-14 in Appendix 2 show the rank correlation coefficients between key variables. In the case of butter there were no significant correlations between beliefs on price/time and other variables. For eggs and margarine there were no significant correlations between beliefs on gaining weight and other variables.
In respect of the link between beliefs to attitudes, significant coefficients were reported for all beliefs about health, and a marginal significance for beliefs on price/convenience with regard to margarine. Towler and Shepherd (1992) also reported that individual belief-evaluation products on healthiness are strongly related to attitudes towards consumption, but found modest relationships for beliefs on convenience and price. Shepherd (1988) identified beliefs about nutrient benefits and sensory attributes (e.g. taste, flavour) as significant predictors of consumption.
Relatively large correlations are noticeable between the pairs of variables related to attitude, habit, consumer preference and intention and similarly for the willingness to consume and the other variables.
The correlation between intention to consume and willingness to consume (the variable added to the original TRA model) deserves particular attention. The correlation between intention and willingness to consume is high for products for which the population purchasing power diminished and the frustrations related to food acquisition are common (fruit, meat, butter) (see Stanculescu, 1999).

In respect of milk, similarly to Shepherd et al. (1991/2) and Saba et al. (1998), the correlations between beliefs and attitudes and beliefs and intentions are smaller than those between attitudes and intention. Habits outweighed attitudes in terms of the impact on the intention to consume (see also Saba, Di Natale, 1998). Indeed beliefs about health appear positively associated to attitudes but also to habit and sometimes to preference (milk, butter, meat, margarine), intention (milk, butter, margarine, fruit), willingness (milk, butter, meat, margarine, fruit) and preference (milk, butter, meat, margarine). Beliefs on gaining weight are negatively associated with preference, intention and willingness to consume meat, albeit at a modest level. It suggests that the stronger are the beliefs that meat is rich in cholesterol and calories, the less likely one would be to consume meat.
Fruit appears to be perceived as a healthy food and beliefs regarding nutrients (e.g. vitamins) form a specific group which is significantly associated with habit. This suggests that in the formation of habit, consumer beliefs about the healthiness of the product are significant. Of course not all habits are related to what may be designated as healthy food.
It is apparent that habit and attitude towards intention are relevant variables influencing the intention to consume food. The willingness to consume is also a relevant variable, as it

allows for the economic restrictions on consumer choices. The coefficients of correlation between variables from the modified TRA were found relatively significant (0.3 and 0.6). The main beliefs identified with factor analysis were used in exploring the relationships with variables from the TRA. The correlation matrices suggested that attitudes, habit and preferences are relevant variables that may have an impact on consumer intention. The analysis also suggested a relevant insight brought by the use of willingness to consume as an endogenous variable. The following section reports on the relationships between habit, preference and attitudes towards intention as potential explanatory variables for both consumer intention and willingness to consume. Unlike the previous section, relationships are calibrated with the structural equation modelling (SEM), which allows simultaneous sets of equations to be estimated. Path coefficients rather than simple correlation coefficients reflect the interdependencies between variables. This latter approach is increasingly used in literature (Saba, Di Natale, 1998) and has replaced the analysis previously based on correlation coefficients. Following a brief theoretical description of SEM (Section 5.3.1), the main outcomes are reported in Section 5.3.2.

5.3. Structural equations modelling

5.3.1. Theoretical framework

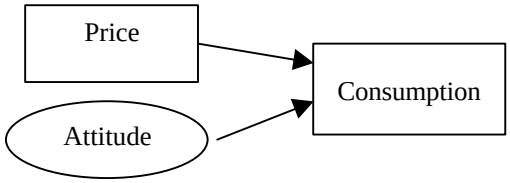
Data was modelled using the SEM available in AMOS 4.0. The SEM allows for a set of simultaneous equations to be estimated. The SEM assumes a causal structure among the latent variables (Mac Lean, Gray, 2000). The error terms, as in other models, are composed of a systematic error term and a random error term.

There are three groups of parameters to be estimated: the regression weights or path coefficients that describe the linear influence of the exogenous variables on the endogenous variables; the variances of exogenous variables; and the covariances between exogenous variables. SEM can be used for testing hypotheses and confirming models of consumer behaviour. SEM have been used in lifestyles research, the study of behavioural and attitudinal intentions (Mac Lean, Gray, 2000).

The SEM approach provides some advantages over the other techniques that may appear similar to the regression model. First is the possibility to model observed as well as latent variables. These are variables that cannot be measured directly, but must use observed or indicator variables. For instance, in consumer research, attitudes are not directly measurable. A set of items can be derived and consumers express their opinions towards each specific item. A score may evaluate the overall attitude.

Second is the possibility to obtain estimates based on simultaneous equations. The path coefficients express the link between the dependent and independent (exogenous) variables. A path diagram traces the relationship between variables in the model in a pictorial representation (Bollen, 1989). The latent variables are drawn as circles or ellipses and the observed variables as rectangles.

Diagram 3. Path diagram showing an illustration of observed and latent variables



In a simple model, Consumption = a + b Price + c Attitude [1]

The intercept is a. The path coefficients are represented by b and c. The equations represent a weighted linear combination of variables, but unlike regression models when there is no missing data, the intercept term may be omitted (Arbuckle, Wothke, 1998). The regression

estimates are called path coefficients and reflect the relationship between dependent variables (called endogenous) and independent variables (referred as exogenous). SEM allows one to test the relationship between hypothesised variables and to postulate whether these are consistent with data (Mac Lean, Gray, 2000). In this paper the SEM approach is used to test the validity of the TRA in explaining food choice in Romania, as follows.

Develop a theoretical based model. The structural equations were specified based on the TRA. The endogeneous variables were represented by the intention to consume six observed foods. All equations contained an error term and an intercept.

Construct a path diagram. In the path diagram ovals represent latent constructs. These were measured through indicators, because the latter were used in the survey to approximate the latent constructs that form the TRA, namely attitudes and habit.

The attitudes and habits were assumed latent constructs. The arrows indicate the direction of the relationship.

Choose the input matrix type. The input data were the variance/covariance matrix for the indicator variables. The use of correlations has the advantage of valid comparisons between population or sub-samples, as variables are standardised. All exogenous variables were measured on a 5-point intensity scale and it is argued that there is comparability between items. It can be assumed that the scales can be treated as metric variables and hence there is no need to use polychoric correlations suitable for ordinal measures. Furthermore, the correlations have the advantage of achieving homogeneity in the unit of measurement through standardisation, and are suitable when the pattern of relationships is of interest.

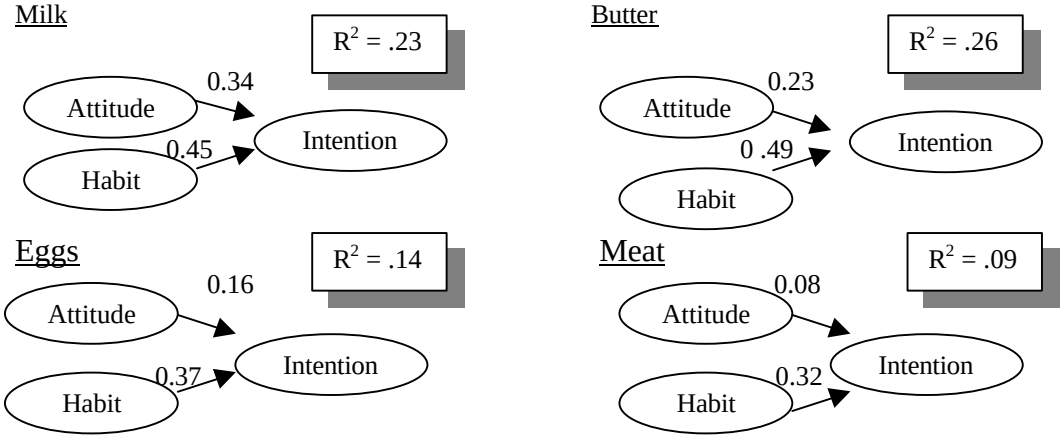
Evaluate model identification, estimates and goodness-of-fit. A large number of fit measures are proposed in literature. Estimates are evaluated based on critical ratios. A value above 1.96 suggests significance at 5% significance level. The ratio of chi square to the degrees of freedom is also examined. Ideally this ratio should be less than five (Maruyama, 1998). The parsimony was achieved by restricting the number of concepts to less than 20 (which was thought too large according to Hair et al., 1995). The models were evaluated and compared based on chi squared test which is sample based, non-normed, but allows comparisons between models. However, one main weakness of this index is that is sensitive to sample size.

5.3.2. Empirical results

The simultaneous equations modelling in AMOS 4.0 was used. The system of equations relating the intention to the exogenous variables (habit and attitude towards intention) is provided below (Maximum Likelihood estimates).

Diagram 4. Path diagram: Model specification –TRA – the working model

χ^2 = 1661.8; degrees of freedom (df) = 141.

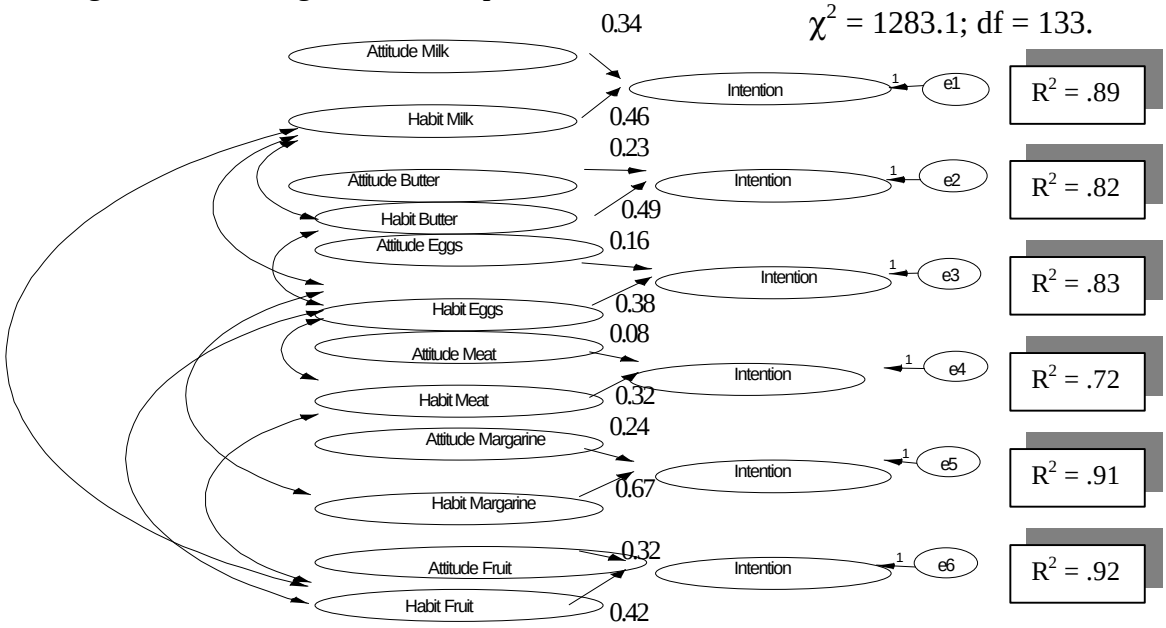


Source: Own calculations

Unstandardised path coefficients are reported in the path diagrams as there is similarity in the scales of the variables used in the model. This approach is adopted in the presentation of all models. All coefficients were significant at 5% significance level, except attitude to consuming meat. The variation accounted by the model was high for margarine, milk and butter.

The working model (WM) was now tested against the constrained model. In a first stage the WM was estimated and significant covariances (at 5% significance level, equivalent to correlation coefficients above >0.3) were identified. An alternative model was developed based on the following constraints: The covariances between the exogenous variables, identified as significant in the unconstrained model, were different from zero. Suppose for instance that according to the original model the covariance between the habit of consuming milk and that of consuming fruit was significantly different from zero. Then these two variables were allowed to covary in the constrained model. The estimates of the constrained model are reported below.

Diagram 5. Path diagram: Model specification –TRA – the restricted model



The arrows indicate the pairs of exogenous variables that were allowed to covary. These covariances become the restrictions imposed on the model. The intercept terms were specified as there were missing data. The latter represented less than 4% of the sample. All path coefficients were significant at 5% significance level.

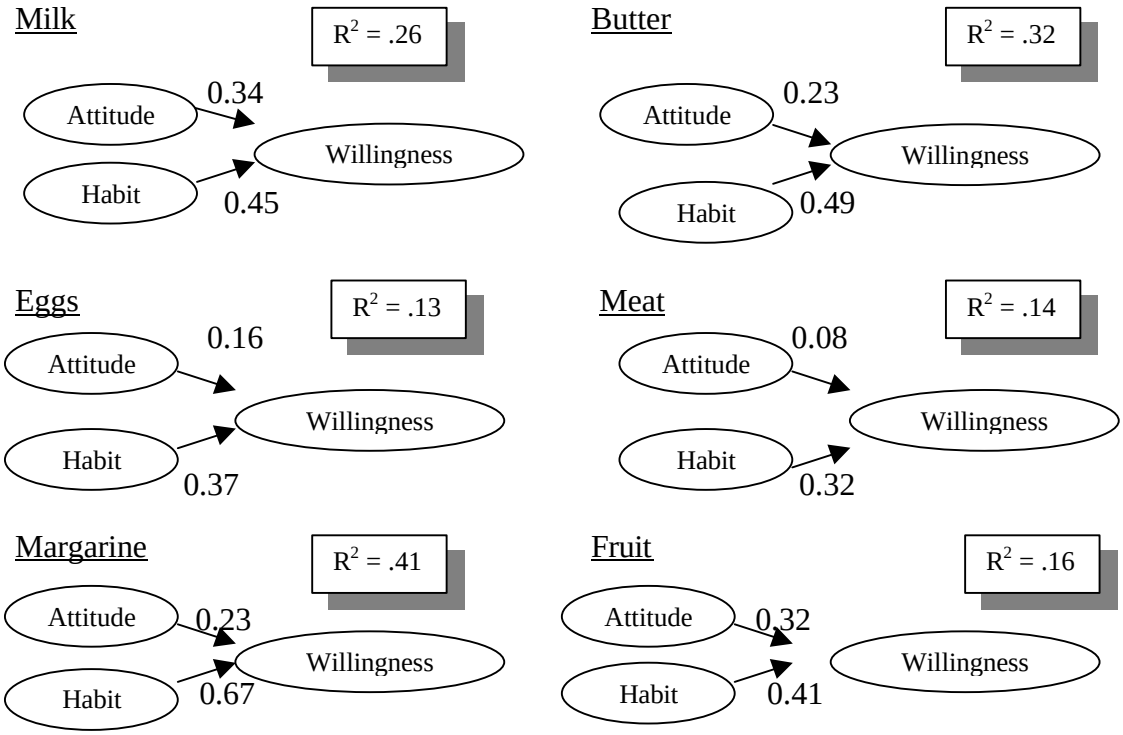
A coefficient of unitary value was specified for the effect of the error term (e_i) the error unit of measurement scale is similar to the dependent variable) (Bollen, 1989).

Note that R^2 can not be interpreted as in a regression model since the variation explained in the dependent variable may be related to the error terms in other equations. However, the improvement in the goodness of fit of the model was clear. The magnitude of R^2 coefficients increased and the ratio of χ^2 relative to the degrees of freedom has declined.

Differences between nested models can be evaluated based on the chi square statistics and degrees of freedom (Bacon, 2000). The difference between the chi squared of the two models (378.7) follows a χ^2 distribution. The actual χ^2 is associated with a p value of 0.000. Hence, the hypothesis that the working model is correct is rejected (Arbuckle, Wothke, 1998). The improved goodness of fit of the constrained model was confirmed.
In the unconstrained model there is a significant variance explained by both the variation in habit and attitudes, particularly for margarine, butter and milk. Overall, habit appears the most significant predictor of consumption intention. It outweighed attitudes in explaining the intention in all cases except milk in the unconstrained model.

5.3.2.1. Extensions of the TRA

When "willingness" replaced "intention" as the endogenous variable, a greater magnitude of the coefficients related to attitudes was noticeable, particularly for butter, meat and margarine.
Diagram 6. Path diagram: Model specification – the modified TRA



Source: Own calculations

Moreover, apart from margarine, R squared improved suggesting that willingness to consume is a relevant variable in extending the TRA in an environment where severe restrictions impinge upon the ability to purchase certain food products.
It is interesting to observe that for products (e.g. butter and meat) whose relative price is high comparative to their substitutes, attitudes play a more significant role with regard to willingness as the latter represent intention when economic variables are held constant. Intention, relative to willingness to consume, tends to be influenced by habit to a greater extent and by attitude to a lesser extent. Below are reported the path coefficients from the constrained model having intention as a function of attitude, habit and preference. Constraints were imposed allowing for significant covariances between habits and preferences identified based on the unconstrained model.
Intention milk = 0.33 + 0.28 Habit + 0.18 Attitude + 0.28 Preference [2]
(5.29) (4.02) (7.96)

Intention butter = 0.16 + 0.41 Habit + 0.17 Attitude + 0.16 Preference [3]
(8.36) (3.93) (4.39)

Intention eggs = 1.27 + 0.26 Habit + 0.10 Attitude + 0.25 Preference [4]
(5.61) (2.41) (7.16)

Intention meat = 1.77 + 0.23 Habit + 0.03 Attitude + 0.22 Preference [5]
(4.91) (0.65) (6.77)

Intention margarine = 0.01 + 0.52 Habit + 0.13 Attitude + 0.28 Preference [6]
(11.97) (3.51) (8.67)

Intention fruit = 0.38 + 0.34 Habit + 0.24 Attitude + 0.18 Preference [7]
(6.88) (4.59) (4.36)

All coefficients are significant at 5% significance level. High coefficients for habit, preferences (milk, eggs, meat, margarine) were noticeable when preferences were added into the TRA model.

6. Conclusions

Apart from economic factors (price and income), non-economic factors such as quality, taste, family members preferences were reported by consumers as the most important to impact on their food choice.

Consumer beliefs about foods are rather heterogeneous. The factor analysis has underlined three main dimensions: beliefs about gaining weight; health, quality and nutrients and price/convenience. Except for meat and eggs, the variation in the variables was well explained by the factor solution. However, among all variables only beliefs about health significantly correlated with the attitudes.

The correlation matrices based on Spearman coefficients showed that attitudes, habit and preferences are relevant variables that may have am impact on consumer intention. The analysis also pointed out a relevant insight brought by the use of willingness to consume as an endogenous variable.

The findings suggest that the TRA in the original form can only partly explain human decisions. Habit was the most significant predictor of consumer purchasing intentions. Like in other studies (Saba, DiNatale, 1998) attitudes and particularly habits, were found to be significant predictors of food choice. These variables accounted for a large share of explained variation in the case of intention to consume margarine, butter and milk. Preferences were also positively linked to intention, though path coefficients were below those for habit. However the impact of these variables upon intention is not even across food groups. An improved explanatory power of the model was found when willingness replaced intention as an endogenous variable.

Appendix 1

Table 3. Milk - Rotated Component Matrix and goodness-of-fit of the factor solution

	1	**2**	**3**	**Communality**
Avoid calories	0.08	0.22	**0.82**	0.72
Easy to prepare	0.14	**0.75**	0.12	0.60
Get proteins	**0.76**	0.14	-0.04	0.60
Healthy food	**0.82**	0.02	0.20	0.71
Get vitamins	0.69	0.27	0.21	0.59
Get calcium	0.61	0.42	0.11	0.57
Quality product	**0.80**	0.06	0.13	0.65
Avoid cholesterol	0.20	-0.01	**0.83**	0.74
Price	0.14	**0.80**	0.05	0.66
Eigenvalues	3.57	1.20	1.07	

Cumulative variance	31	48	65	

Table 4. Butter - Rotated Component Matrix and goodness-of-fit of the factor solution

	1	**2**	**3**	**Communality**
To avoid calories	-0.01	0.13	**0.84**	0.72
Easy to prepare/cook	0.27	**0.68**	0.06	0.54
Get proteins	**0.75**	0.20	-0.07	0.61
Healthy food	**0.83**	0.05	0.15	0.71
Get vitamins	0.64	0.35	0.19	0.56
Get calcium	0.63	0.31	0.32	0.59
Quality food	**0.81**	0.02	0.05	0.65
Avoid cholesterol	0.21	-0.09	**0.75**	0.61
Food prices	0.06	**0.85**	-0.02	0.73
Eigenvalues	3.43	1.25	1.06	
Cumulative variance	38	52	64	

Table 5. Eggs - Rotated Component Matrix and goodness-of-fit of the factor solution

	1	**2**	**3**	**Communality**
Avoid calories	0.12	**0.81**	0.07	0.680
Easy to prepare/cook	0.19	0.13	**0.73**	0.582
Get proteins	0.71	0.13	0.21	0.562
Healthy food	**0.81**	0.14	0.03	0.675
Get vitamins	0.65	0.10	0.30	0.519
Get calcium	0.69	0.04	0.29	0.565
Quality food	**0.82**	0.03	0.01	0.668
Avoid cholesterol	0.10	**0.84**	0.03	0.715
Food prices	0.15	-0.04	**0.81**	0.677
Eigenvalues	3.36	1.27	1.01	
Cumulative variance	37	51	63	

Table 6. Meat - Rotated Component Matrix and goodness-of-fit of the factor solution

	1	**2**	**Communality**
To avoid calories	0.10	**0.70**	0.50
Easy to prepare/cook	0.57	-0.12	0.34
Get proteins	**0.70**	0.15	0.52
Healthy food	0.63	0.35	0.51
Get vitamins	**0.66**	0.29	0.51
Get calcium	**0.69**	0.28	0.55
Quality food	0.61	0.27	0.45
Get fibre	0.61	0.31	0.47
Avoid cholesterol	0.09	**0.81**	0.66
Food prices	0.62	-0.19	0.42
Eigenvalues	3.76	1.16	
Cumulative variance	38	49	

Table 7. Margarine - Rotated Component Matrix and goodness-of-fit of the factor solution

	1	**2**	**Communality**
Avoid calories	0.10	**0.83**	0.70
Easy to prepare/cook	0.47	0.08	0.23
Get proteins	**0.75**	0.04	0.56
Healthy food	**0.72**	0.17	0.55
Get vitamins	0.71	0.27	0.57
Get calcium	0.66	0.25	0.50
Quality food	**0.74**	0.00	0.55
Get fibre	0.61	0.31	0.47
Avoid cholesterol	0.06	**0.79**	0.62
Food prices	0.25	0.35	0.19
Eigenvalues	3.70	1.24	
Cumulative variance	37	49	

Table 8. Fruit - Rotated Component Matrix and goodness-of-fit of the factor solution

	1	**2**	**3**	**Communality**
To avoid calories	-0.26	**0.74**	**0.85**	0.61
Easy to prepare/cook	0.36	0.33	0.24	0.23
Get proteins	**0.81**	0.08	-0.48	0.66
Healthy food	0.30	**0.73**	0.14	0.63
Food prices	0.49	0.04	-0.20	0.24
Get vitamins	0.29	0.69	0.11	0.56
Get calcium	**0.74**	0.22	-0.11	0.60
Quality food	0.37	0.59	0.17	0.49
Get fibre	0.58	0.38	0.01	0.48
Eigenvalues	3.28	1.22	0.98	
Cumulative variance	36	50	61	

Appendix 2

Spearman rank correlation coefficients between key variables [1]

Table 9 - Milk

	Beliefs on health	Beliefs on price/time	Beliefs on weight	Attitude	Intention	Habit	Preference
Attitude	0.19						
Intention	0.17		0.1	0.36			
Habit	0.25			0.34	0.44		
Preference	0.14	-0.12		0.4	0.49	0.48	
Willingness	0.12		0.03	0.41	0.72	0.44	0.53

Table 10 – Butter

	Beliefs on health	Beliefs weight	Attitude	Intention	Habit	Preference
Attitude	0.35					
Intention	0.13		0.35			
Habit	0.17		0.34	0.47		
Preference	0.13		0.41	0.39	0.43	
Willingness	*0.12*	*0.11*	0.44	0.67	0.48	0.5

Table 11 - Eggs

	Beliefs on health	Attitude	Intention	Habit	Preference
Attitude	0.31				
Intention		0.21			
Habit	0.15	0.22	0.38		
Preference		0.25	0.36	0.39	
Willingness		0.22	0.67	0.36	0.36

Table 12 – Meat

	Beliefs on health	Beliefs on weight	Attitude	Intention	Habit	Preference
Attitude	0.27					
Intention		-0.14	0.15			
Habit	0.17		0.24	0.32		
Preference	0.15	*-0.1*	0.3	0.35	0.34	
Willingness	*0.12*	*-0.12*	0.28	0.59	0.31	0.34

Table 13 – Margarine

	Beliefs on health	Beliefs on price/time	Attitude	Intention	Habit	Preference
Attitude	0.37	0.14				
Intention	0.13		0.44			
Habit	0.13	0.19	0.47	0.63		
Preference	*0.12*		0.43	0.57	0.48	
Willingness	0.16		0.48	0.78	0.57	0.53

Table 14 – Fruit

	Beliefs on nutrients	Beliefs on health	Attitude	Intention	Habit	Preference
Attitude	0.07	0.13				
Intention	-0.02	0.18	0.26			
Habit	*0.12*	*0.10*	0.15	0.4		
Preference	0.07	0.22	0.23	0.31	0.35	
Willingness	0.04	0.15	0.26	0.57	0.34	0.28

2 - all coefficients are significant at 1% except for those in italics - significant at 5%.

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