

Development of a Measure of the Motives Underlying the Selection of Food: the Food Choice Questionnaire

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A number of factors are thought to influence people's dietary choices, including health, cost, convenience and taste, but there are no measures that address health-related and non-health-related factors in a systematic fashion. This paper describes the development of a multidimensional measure of motives related to food choice. The Food Choice Questionnaire (FCQ) was developed through factor analysis of responses from a sample of 358 adults ranging in age from 18 to 87 years. Nine factors emerged, and were labelled *health*, *mood*, *convenience*, *sensory appeal*, *natural content*, *price*, *weight control*, *familiarity* and *ethical concern*. The questionnaire structure was verified using confirmatory factor analysis in a second sample ($n=358$), and test-retest reliability over a 2- to 3-week period was satisfactory. Convergent validity was investigated by testing associations between FCQ scales and measures of dietary restraint, eating style, the value of health, health locus of control and personality fact9(a(ad167W)1 TDhiuehe)

attitudes relevant to theoretical frameworks such as the health belief model and the transtheoretical model of change have been developed (Kristal *et al.*, 1990; Smith & Owen, 1992; Treknner *et al.*, 1990). For example, Glanz *et al.* (1993) have described measures of psychosocial factors influencing fat and fibre consumption, including items related to beliefs in the links between diet and disease, perceived benefits and barriers to behaviour change, social support, social norms, motivation and self-efficacy. This work holds the promise of leading to improved dietary modification programmes (McCann *et al.*, 1990). However, health is clearly not the only factor people take into account when choosing their food, and a focus on health may lead to exclusive emphasis on a set of motives that are of limited significance for many people. It is therefore important to explore the role of other influences on food choice.

It has long been recognized that food availability and cultural factors are dominant in food selection. Cultural influences lead to differences in the habitual consumption of certain foods and in traditions of preparation, and in certain cases can lead to restrictions such as exclusion of meat and milk from the diet (Lau, Kronld & Coleman, 1984). Food is a focus of social interaction, and the consumption of "prestige" foods may become an index of social status (Sanjur, 1982). The system of provision, including food production and manufacture, marketing, delivery and sale, has been shown to have a major impact on what people eat (Fine & Leopold, 1993). At the individual level, taste or sensory appeal, likes and dislikes, and sheer habit are all relevant (Kronld & Lau, 1982; Rozin, 1984; Parraga, 1990). Taste may be particularly important in selection of high fat diets, since fats are responsible for the texture and aroma of many foods (Drenowski, 1992). On the other hand, "healthy" diets may be consumed for non-health reasons such as concern about appearance (Cockerham, Kunz & Lueschen, 1988). Weight control is a major determinant of food choice for individuals concerned about their body weight. The growth in environmental awareness over the past two decades has led to concerns about the use of natural ingredients and packaging that may have an impact on purchasing decisions. There is also evidence that stress and negative emotions may influence food selection and consumption (McCann, Warnick & Knopp, 1990; Wardle, 1987a). All these factors indicate that health is only one of many considerations relevant to food choice. More effective implementation of health promotion strategies may depend on the recognition of the status of health in comparison with other motives in the selection of food.

Multidimensional Measures of Food Choice

Efforts to develop multidimensional measures of factors related to food choice at the individual level, including both health and non-health motives, have been limited. Repertory grid approaches have been attempted, but these are time-consuming and patterns tend not to be stable across individuals (Bell *et al.*, 1981; Tuorila & Pangborn, 1988). Ratings of different foods on dimensions such as pleasure, health, tradition, convenience, familiarity, prestige and price were described by Lau *et al.* (1984) and by Rappaport and coworkers (1992), but in neither case was a formal set of measures developed. A more systematic method was developed by Michela and Contento (1986) in a study of 5- to 13-year-old children. A series of foods were rated on a number of dimensions including healthfulness, taste, convenience and social influence. Substantial variations in the intraindividual correlations between

evaluative ratings and consumption of these same foods were found, and clusters of subjects characterized by different motivational patterns were identified.

This approach has been extended by Wardle (1993) who included ratings of liking (taste) and health for a range of foods in a study of mothers and their adult children. Two indices were constructed for each individual based on the correlation between liking ratings and consumption frequency (taste index) and between "healthiness" ratings and consumption frequency (health index). The taste index was consistently higher than the health index, although there was a good deal of variation across individuals in both. The health index was higher in older women than either their adult sons or daughters. The advantage of this method is that it circumvents the need for subjects to give introspective reports on their motives, but it has the drawback of being time-consuming and inappropriate for large-scale research.

More conventional questionnaire methods have been developed for the investigation of eating disorders, including the restraint scale (Polivy, Herman & Warsh, 1978), the Three Factor Eating Questionnaire (Stunkard & Messick, 1985) and the Dutch Eating Behaviour Questionnaire (Van Strein *et al.*, 1986). However, these measures are more concerned with cognitive restraints on food intake and the circumstances surrounding excessive consumption than with the factors influencing food choice. An 18-item Reasons for Eating Scale was devised by Harmatz and Kerr (1981), and responses from 110 students were factor analysed by Williams, Spence and Edelman (1987). Six factors emerged, highlighting the importance of affect on eating, as well as sensory appeal, habit and pleasure in food preparation. However, the questionnaire was developed for the investigation of obesity, and is limited in scope.

The Nutrition Attitudes Survey, a measure of attitudes relevant to low-fat diets, has been described by Hollis *et al.*

through factor analysis, its validation in an independent sample using confirmatory factor analysis, test–retest reliability over a 2- to 3-week interval, and associations with other variables such as sex, age, income, eating style, social desirability biases and health values. The relationship between responses to the questionnaire and patterns of food consumption is a separate issue related to the applications rather than validation of the instrument, so will be presented elsewhere.

Study 1

In Study 1, a preliminary food choice questionnaire of 68 items was generated through consideration of existing literature and discussion with nutritionists and health psychologists. Items covered various motives that have been identified in other research, including commonly recognized factors such as health, sensory appeal, convenience of purchase and cost, together with areas of potential significance such as environmental concerns and the extent to which food conforms to the preferences of family and peer group. Measures of dietary restraint, emotional eating, social

eat (see Table 1). Subjects were asked to endorse the statement "It is important to me that the food I eat on a typical day . . ." for each of the 68 items by choosing between four responses: *not at all important*, *a little important*, *moderately important* and *very important*, scored 1 to 4.

Dietary restraint and eating style

Eating style was assessed with the Dutch Eating Behaviour Questionnaire (DEBQ) (Van Strein *et al.*, 1986). This measure consists of 33 items concerning eating habits that assess three factors: *restrained eating*, indexing restraint in the consumption of food and dieting behaviour; *emotional eating*, where items concern eating when upset or in negative moods; and *external eating*, concerned with disinhibition and eating in response to the sight or smell of food. Scores on each scale could range from 1–5, with higher scores indicating greater restraint, sensitivity to emotional conditions and sensitivity to external cues. The scale has advantages over other similar measures (Wardle, 1986), and has been shown to be robust in the U.K. population (Wardle, 1987b). The internal consistency (Cronbach α) scores in the present sample were 0.92, 0.95 and 0.77 for the restraint, emotional eating and external scales respectively.

Value of health

The value that individuals place on good health was assessed using the Health as a Value scale developed by Lau, Hartman and Ware (1986). This four-item questionnaire consists of statements such as "If you don't have your health, you don't have anything", and responses were scored on a six-point scale where 1 = *strongly disagree* to 6 = *strongly agree*. Ratings across the four items were averaged to produce scores in the range 1–6. The Health as a Value scale is a reliable measure that has been widely used in health research.

Social desirability

Social desirability biases were assessed using the ten-item reduction of the Marlowe Crowne social desirability scale developed by Strahan and Gerbasi (1972), in which higher scores reflect greater tendencies towards producing socially favourable responses.

Results

Scale Construction and Factor Analysis

The 68 items of the FCQ were factor analysed with varimax rotation. Various solutions were considered, but the structure that appeared best to combine ecological sense with parsimony involved nine factors that together accounted for 49.5% of the variance, with Eigen values ranging from 12.4 to 1.72. Items with a severely skewed distribution and those which did not load clearly on a single factor were discarded. In order to develop a relatively short questionnaire, a maximum of six was set on the number of items included on each scale, and the highest loading items were selected. This procedure resulted in the retention of 36 items.

Table 1 summarizes the factor analysis performed on the 36 item FCQ. The nine factors accounted for 65.2% of the variance. Factor 1 consists of six health-related statements and is therefore labelled *health* (Cronbach α = 0.87). Factor 2 is composed

Table 1
Food Choice Questionnaire—items and factor loadings

It is important to me that the food I eat on a typical day:	Loading
Factor 1—Health	
22. Contains a lot of vitamins and minerals	0.77
29. Keeps me healthy	0.75
10. Is nutritious	0.75
27. Is high in protein	0.72
30. Is good for my skin/teeth/hair/nails etc	0.68
9. Is high in fibre and roughage	0.66
Factor 2—Mood	
16. Helps me cope with stress	0.79
34. Helps me to cope with life	0.79
26. Helps me relax	0.78
24. Keeps me awake/alert	0.60
13. Cheers me up	0.60
31. Makes me feel good	0.57
Factor 3—Convenience	
1. Is easy to prepare	0.82
15. Can be cooked very simply	0.81
28. Takes no time to prepare	0.76
35. Can be bought in shops close to where I live or work	0.65
11. Is easily available in shops and supermarkets	0.59
Factor 4—Sensory Appeal	
14. Smells nice	0.80
25. Looks nice	0.72
18. Has a pleasant texture	0.70
4. Tastes good	0.53

Table 2
Intercorrelations ($r = 100$) between Food Choice Questionnaire factors

	Health	Mood	Convenience	Sensory appeal	Natural content	Price	Weight control	Familiarity
Mood	34*							
Convenience	14	27*						
Sensory appeal	19*	32*	5					
Natural content	59*	28*	- 5	22*				
Price	20*	14	32*	4	9			
Weight control	38*	21*	7	2	31*	14		
Familiarity	9	34*	29*	13	8	13	- 5	
Ethical concern	37*	25*	12	13	39*	22*	9	10

* $p < 0.001$.

of six items concerning stress, coping and mood, and is consequently labelled *mood* ($\alpha = 0.83$). Factor 3 has five items and concerns ease of food purchase and preparation, and is therefore considered to be a *convenience* factor ($\alpha = 0.81$). Factor 4 consists of four statements related to appearance, smell and taste, and can be regarded as indexing *sensory appeal* ($\alpha = 0.70$). Factor 5 includes three items related to the use of additives and natural ingredients, and is labelled *natural content* ($\alpha = 0.84$). Factor 6 has three items associated with cost of food, and indexes *price* as a motive in food selection ($\alpha = 0.82$). Factor 7 consists of three items related to consumption of low calorie food and is labelled *weight control* ($\alpha = 0.79$). Factor 8 is also composed of three items, and these are associated with *familiarity* ($\alpha = 0.70$). Factor 9 has three items concerned with environmental and political considerations and is labelled *ethical concern* ($\alpha = 0.70$).

Scores on each scale were computed by averaging unweighted ratings for individual items, so could range from a minimum of 1 to a maximum of 4. The intercorrelations between the scales of the FCQ are shown in Table 2. A number of significant associations were observed. The most prominent was between food choice motives related to health and to natural content ($r = 0.59$). There were also moderate correlations between health and mood, ethical concern and weight control, between mood, sensory appeal and familiarity, and between convenience and price. However, none of these remaining correlations implied more than 14% shared variance.

The associations between the FCQ and other measures such as the DEBQ and Health as a Value questionnaire are discussed later in the section on convergent validity.

Study 2

Study 2 was designed to assess the replicability of the nine-factor FCQ in a new community sample, and test the reproducibility scores over a 2- to 3-week period. In addition, the associations between the FCQ and two pertinent personality traits,

neuroticism and openness to experience, were evaluated. The internal subscale of the Multidimensional Health Locus of Control (MHLOC), Health as a Value and the social desirability measure were also administered.

Method

Subjects

A postal survey was carried out with 400 students and 641 London residents. Replies were received from 135 (34.0%) students and 223 (34.8%) residents, giving a sample of 358. The mean age was 30.5 (*SD* 14.3) with a range of 17–89 years, and the sample included 184 women and 174 men. The mean body mass index was 23.8 kg/m² (*SD* 3.5), and no participants reported suffering from a chronic disease involving a special diet. The proportion of married subjects was 66.3%, while 29.2% were single and 4.5% were divorced or widowed. The number of respondents with children living at home was 54 (15.1%), a similar proportion to that found in Study 1. The proportion of respondents in full or part-time employment was 44.7%, 40.9% were students, 7% were unemployed or homemakers and 6.4% were retired. Educationally, 10.9% had no formal qualifications, and 12.3% had achieved GCSE level. The proportion with A levels (high school completion) was 51.0% while 25.8% had degrees. In terms of annual income distribution, 50.1% reported an income of less than £5000; £5000–£10 000, 7.8%; £10 000–£15 000, 11.6%; £15 000–£20 000, 9.9%; £20 000–£30 000, 10.4%; >£30 000, 10.1%.

Two weeks after receipt of the questionnaires, a repeat questionnaire (consisting of the FCQ and a food frequency questionnaire) was sent out. The food frequency data are not described in this report. A total of 245 (68.4%) of subjects returned the second questionnaire within a 48-day period. The average number of days between completion of the two questionnaires was 19.7 (*SD* 5.2).

Materials

In addition to the 36-item FCQ, health as a value and social desirability measures described earlier, additional questionnaires were as follows.

Personality

Two factors from the NEO Five-Factor Inventory (Form S) were administered (Costa & McCrae, 1991). We selected neuroticism as potentially relevant in the light of its relationship with health risk, stress and coping, and the openness to experience factor as potentially relevant to willingness to eat a wide range of foods. Each factor consists of twelve items rated on a five-point scale, and scores could range from 0 to 48 with higher ratings representing greater neuroticism and openness to experience. The reliability of the measure has been extensively evaluated, and it has been used widely in personality research, counselling and health psychology (Costa & McCrae, 1992).

Locus of control

Respondents' beliefs in their ability to influence their own health status were assessed with the internal health locus of control scale (Form B) from the MHLOC

(Wallston, Wallston & DeVellis, 1978). This scale consists of six items (e.g. "I am directly responsible for my health"), and subjects responded on a six-item scale ranging from 1 = *strongly disagree* to 6 = *strongly agree*. Ratings were averaged to produce a score in the range 1–6, with higher scores reflecting greater perceptions of internal control over health.

Data Analysis

Confirmatory factor analysis was carried out with structural equation modelling using the EQS program (Bentler, 1989), with the generalized least squares (GLS) normal theory estimation method. Because χ^2 fit indices are sensitive to sample size, models with good fit may show large χ^2 values when the sample size is large. We therefore used the ratio of chi-squared to degrees of freedom as suggested by Marsh, Balla and McDonald (1988), with values under five indicating reasonable fit. In addition, the non-normed fit index (NNFI, Bentler & Bonett, 1980) and the comparative fit index (CFI, Bentler, 1990) were used to evaluate model fit.

Results

Confirmatory Factor Analysis

The simple nine-factor model in which each item of the FCQ loaded on a single factor provided a good fit for the data collected in Study 2 ($n = 358$), $\chi^2 = 997$, $df = 594$, $p < 0.001$; NNFI = 0.991; CFI = 0.991 (Fig. 1). All parameters estimates were significant at $p < 0.001$. Allowing factors to intercorrelate gave a modest improvement in fit. These analyses indicate that the FCQ factor structure identified in Table 1 was confirmed in the independent Study 2 sample.

Test-Retest Reliability and Internal Consistency

It can be seen that all correlations between scores at the two administrations of each FCQ scale were > 0.70 (Table 3), suggesting that the reliability of the scales is acceptable. The mean scores on the two occasions were significantly different for two factors, *health* and *mood*, $t(245) = 2.42$ and 2.98 respectively, $ps < 0.025$. In each case, average ratings were slightly reduced on the second occasion. Intercorrelations between the factors were similar to those detailed for Study 1 in Table 2. The internal consistency of the FCQ factors was high, with Cronbach α scores as follows: *health* = 0.81, *mood* = 0.83, *convenience* = 0.84, *sensory appeal* = 0.72, *natural content* = 0.86, *price* = 0.83, *weight control* = 0.85, *familiarity*

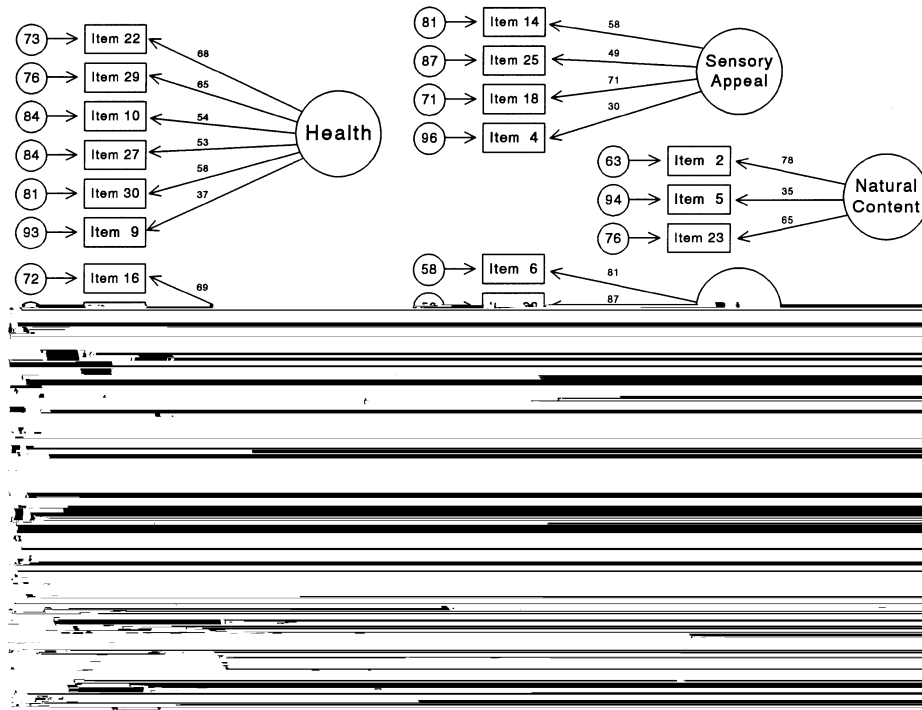


Figure 1. Summary of confirmatory factor analysis model for the Food Choice Questionnaire. Rectangles represent the measured variables, with item numbers corresponding to items in the FCQ (see Table 1). Large circles are latent constructs (factors) and small circles are residual variances ($\hat{\sigma}^2$). Parameter estimates are standardized ($\hat{\beta}$).

Table 3

Table 4
 Average ratings on the Food Choice Questionnaire in men and women.
 Studies 1 and 2 combined (n= 706)

Scale	Men		Women	
	Mean	Standard deviation	Mean	Standard deviation
Health	2.64	0.77	3.01	0.62
Mood	2.00	0.73	2.21	0.74
Convenience	2.63	0.76	2.87	0.73
Sensory appeal	2.92	0.63	3.00	0.60
Natural content	2.27	0.84	2.64	0.83
Price	2.62	0.82	2.88	0.75
Weight control	2.01	0.81	2.60	0.79
Familiarity	1.79	0.71	1.79	0.71
Ethical concern	1.77	0.74	2.06	0.76

higher than for men. Effects were particularly prominent for *health* and *weight control*, with mean differences of 0.36 and 0.59 respectively.

There were a number of significant correlations between FCQ scales and age. For both women and men, significant positive correlations were found between age and *natural content* ($r=0.22$ and 0.23 , $p<0.001$), *familiarity* ($r=0.30$ and 0.18 , $p<0.001$) and *ethical concern* ($r=0.12$ and 0.20 , $p<0.025$). In addition, positive correlations in women were seen between age and *health* ($r=0.22$, $p<0.001$) and *sensory appeal* ($r=0.18$, p

Table 5
Motives for food choice in relation to income

Scale	Low income		Medium income		High income	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Health	2.82	0.73	2.96	0.67	2.71	0.73
Mood	2.13	0.75	2.13	0.72	2.02	0.72
Convenience	2.78	0.72	2.83	0.73	2.62	0.80
Sensory appeal	2.87	0.64 ^a	3.02	0.59 ^b	3.01	0.58 ^b
Natural content	2.35	0.86	2.64	0.82	2.42	0.86
Price	3.12	0.70				

value of health was not related to the importance placed on convenience, price, familiarity or ethical factors in determining the choice of food.

Since preoccupation with weight control is central to dietary restraint, we predicted that the *weight control* factor would be correlated with the restraint scale of the DEBQ. Restraint scores were low among men (mean 2.19, *SD* 0.80), so analyses of this factor were confined to women. Usable data were available from 214 of the 220 women in Study 1, and they were divided by median split into those with low (mean 2.13, *SD* 0.50) and high (mean 3.53, *SD* 0.51) restraint scores. Multivariate analysis of the FCQ with age and social desirability as covariates showed a significant effect of restraint group overall, $F(9,189) = 13.9$, $p < 0.001$. Univariate effects were significant only for two scales. As predicted, FCQ *weight control* scores were higher in the restrained than unrestrained women, mean 2.94, *SD* 0.64 vs. 2.12, *SD* 0.61, $F(1, 197) = 88.8$, $p < 0.001$. In addition, *price* was considered less significant for high- than for low-restrained women, mean 2.72, *SD* 0.79 vs. 2.94, *SD* 0.68, F

suggested that the factors are robust, and adequate short-term stability has also been established.

Since a number of the FCQ scales were intercorrelated, the possibility of a smaller group of higher order factors being useful was explored. A three-factor solution accounted for 58% of the variance, with the FCQ health, natural content, weight control and ethical concern loading on factor 1, convenience and price on factor 2, and mood, sensory appeal and familiarity on factor 3. However, we do not favour this approach for two reasons. Firstly, some individual FCQ scales did not load on single factors: mood and familiarity shared high loading on two or three factors. Secondly, it may be more useful to be able to investigate a wider range of specific motives related to food choice, rather than broad dimensions.

In terms of individual scales, the *health* factor contains items related to the prevention of chronic disease (e.g. "high in fibre and roughage") and to general nutrition and well-being (e.g. "nutritious"). The preliminary questionnaire administered in Study 1 contained several other items related to nutrition and health (e.g. "easy to digest", "part of a balanced diet") that loaded on the health factor, but less strongly than the six items selected for the final inventory. The health factor also included the item "good for my skin/teeth/hair/nails etc". This is consistent with evidence that concern for appearance may predict healthy dietary choices (Hayes & Ross, 1987). It is interesting that the item "low in fat" did not load on the health but on the weight control factor. It is possible that the association of dietary fat with weight is a consequence of the sample containing a high proportion of young adults, and that in a middle-aged group more conscious of cardiovascular disease risk, fat restriction would have been linked with health and chronic disease prevention. The sex difference in ratings on the health scale indicates that women pay more attention to this factor than do men. The result is consistent with other studies of health-related behaviours and beliefs, which typically show healthier dietary choices and more positive attitudes towards the health benefits of salt and fat restriction and increased fibre intake in women than men (Wardle & Steptoe, 1991). The importance of health as a reported motive for food choice increased with age in women but not men. Convergent validity for the health scale was provided by the significant and positive associations with health as a value and internal health-related locus of control.

The *mood* scale contains items related to general alertness and mood, as well as to relaxation and stress control. The emergence of this factor suggests that mood and stress may play a role in determining not only the quantity of food consumed, but also the selection of foods (Wardle, 1987a). Convergent validity for the mood factor was evaluated by its relationship with the emotional eating and external eating scales of the DEBQ. These effects were seen in women but not men, for whom DEBQ scores were very low, suggesting that there may be sex differences

in this analysis, since health was not significantly associated with convenience, while health and sensory appeal showed a small but reliable positive correlation (Table 2). The discrepancy with earlier findings may have resulted from the very different

and people will be more likely to select what they know they like. Corroborative evidence concerning the familiarity scale is provided by the negative correlations with the openness to experience factor on the NEO Five-Factor Personality Inventory. High scores on this personality factor are thought to reflect openness to new experiences and broad interests, and might therefore be relevant to adventurousness in food choice.

Ethical concern emerged as an independent factor influencing food choice. Items related to environmental and political issues loaded on this factor. It is notable that ethical concern was not correlated with social desirability scores at a statistically

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