

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 factors. Differences in motives for food choice associated with sex, age and income were found. The potential uses of this measure in health psychology and other areas are discussed.

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INTRODUCTION

Concern about food choices that may have adverse effects on health is widespread in the developed world, and is embodied in documents such as *Healthy People 2000* (1992) and *The Health of the Nation* (1992). Recommendations to restrict salt and fat intake and increase complex carbohydrate and fibre consumption are central tenets in public health nutrition guidelines (Cannon, 1992). Nevertheless, fat consumption remains high in the western world, and is increasing in countries undergoing industrial development (Lands *et al.*, 1990; Trichopoulou & Efstathiadis, 1989).

Effective modification of dietary patterns depends on an understanding of the factors governing food choice. Recent years have witnessed growing interest in studying the attitudes and beliefs associated with healthy eating. Measures of

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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.* (1986). Four factors emerged from the survey of 357 adult volunteers, and included "helpless and unhealthy", "food exploration", "meat preference" and "health consciousness". The helpless and unhealthy and meat preference factors were both associated with high meat consumption and with elevated low density lipoprotein concentration in the blood, while the health consciousness factor was associated with lower meat consumption. The helpless and unhealthy factor identified by Hollis *et al.* combines items about convenience (e.g. "many days, because I'm in a hurry, I eat whatever is handy"), mood and affect ("I eat more when I feel down"), and low self-efficacy ("when it comes to food, I have no will-power"). The health consciousness factor predominantly indexes willingness to change ("to avoid heart disease, I would be willing to alter my eating habits") rather than concerns about health that currently govern food choice. The general applicability of the measure is limited by the omission of items concerning sensory appeal and cost.

Evaluation of this literature suggests that the development of a multidimensional questionnaire to assess the perceived importance of different factors in food choice might be valuable both in the investigation of food consumption and in health and consumer psychology more broadly. The assessment of different factors within the same measure allows direct comparisons to be made about the relative importance of dimensions such as health, price, sensory appeal and convenience. We hypothesized that several distinct factors associated with food choice would be identified as well as the four listed above, since concern with weight control, the degree of familiarity of the food, and mood have all been cited as relevant in previous studies. In this paper, we describe the development of the measure and identification of dimensions

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 desirability response biases, and health value were also administered, and associations with food choice factors evaluated as evidence of convergent validity. Demographic characteristics including marital status, occupation, education, income and eating habits (vegetarian etc.) were also collected.

METHOD

Subjects

Questionnaires were posted to 105 university students, 90 employees of a university library, and 635 people selected at random from the electoral register of a London borough; 68% of the students, 64% of the library employees and 40% of the London residents returned completed questionnaires, giving a sample of 358. The sample included 220 women and 138 men, and ranged in age from 18–87 (mean 34.1, *SD* 15.2). The body mass index of participants averaged 23.7 (*SD* 3.2). No respondents stated that they suffered from a chronic disease requiring a special diet; 40.9% were married or living with a partner, 49.3% were single, and 9.8% were separated or widowed; 64 subjects (17.9%) reported that children lived at home with them; 61% of the sample were in full or part-time employment, 23.2% were students, 8.9% were unemployed or homemakers and 6.7% were retired. In terms of education, 10.8% had no formal qualifications while a further 15.6% left school having completed the General Certificate of Secondary Education (GCSE, equivalent to tenth grade); 38.4% had completed high school with A level qualifications, and 35.2% had university degrees. The reported annual income of subjects was distributed as follows: <£5000, 34.5% (mainly students); £5000–£10 000, 10.7%; £10 000–£15 000, 18.1%; £15 000–£20 000, 12.4%; £20 000–£30 000, 13.6%; >£30 000, 10.7%.

Materials

Preliminary food choice questionnaire (FCQ)

The preliminary questionnaire was designed to assess a wide range of considerations that might be taken into account by individuals when choosing what to

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 $\alpha = 0.87$). 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
Factor 5—Natural Content	
2. Contains no additives	0.81
5. Contains natural ingredients	0.72
23. Contains no artificial ingredients	0.71
Factor 6—Price	
6. Is not expensive	0.87
36. Is cheap	0.87
12. Is good value for money	0.76
Factor 7—Weight Control	
3. Is low in calories	0.87
17. Helps me control my weight	0.79
7. Is low in fat	0.74
Factor 8—Familiarity	
33. Is what I usually eat	0.79
8. Is familiar	0.79
21. Is like the food I ate when I was a child	0.66
Factor 9—Ethical Concern	
20. Comes from countries I approve of politically	0.87
32. Has the country of origin clearly marked	0.79
19. Is packaged in an environmentally friendly way	0.43

Item numbers refer to the order in which statements were presented in the final 36 item Food Choice Questionnaire.

The full factor analysis matrix is available on request from the authors.

TABLE 2
Intercorrelations ($\times 100$) 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/m⁻² (*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*=0.72, *ethical concern*=0.74.

Associations with Sex, Age and Income

A comparison was made of body mass index and of scores on the FCQ scales in Studies 1 and 2, including sex as a factor and covarying for age. No significant differences between studies were observed. Consequently, the samples from Studies 1 and 2 were combined for investigating differences by sex, age and income.

The multivariate analysis of variance comparing men and women with age as a covariate showed an overall effect of sex, $F(9,651)=14.3$, $p<0.001$ (Table 4). Separate

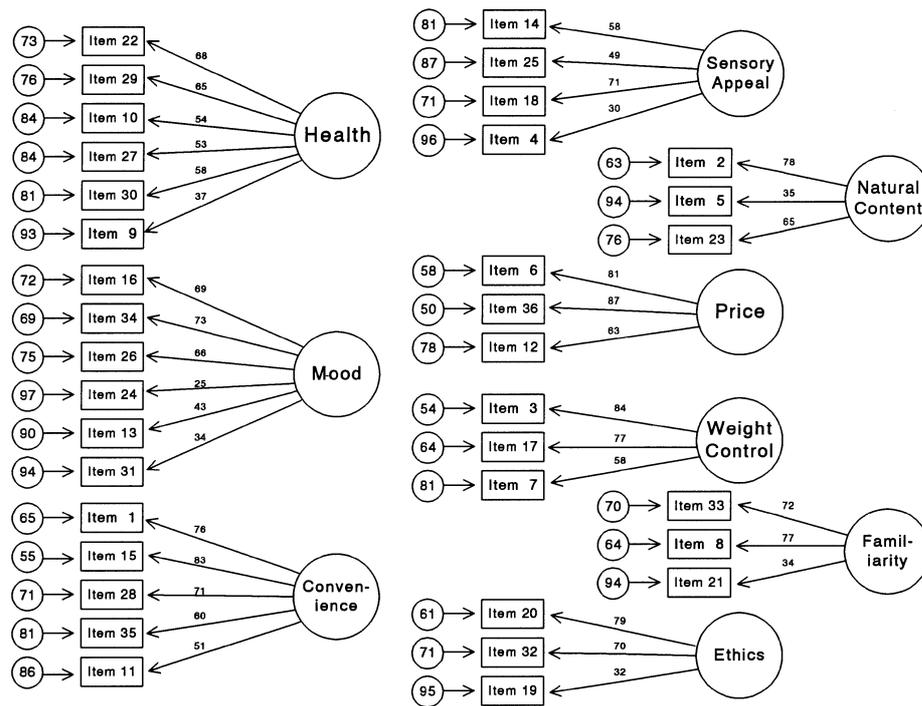


FIGURE 1. Summary of confirmatory factor analysis model for the Food Choice Questionnaire. Rectangles represent the measured variables, with item numbers corresponding to items in the FCQ (see Table 1). Large circles are latent constructs (factors) and small circles are residual variances ($\times 100$). Parameter estimates are standardized ($\times 100$).

TABLE 3
Test-retest reliability of the Food Choice Questionnaire ($n = 245$)

Scale	Time 1		Time 2		Correlation coefficient
	Mean	Standard deviation	Mean	Standard deviation	
Health	2.83	0.72	2.77	0.70	0.814
Mood	2.11	0.73	2.01	0.77	0.771
Convenience	2.75	0.80	2.74	0.79	0.830
Sensory appeal	2.99	0.63	2.94	0.65	0.729
Natural content	2.47	0.86	2.48	0.86	0.811
Price	2.83	0.80	2.79	0.79	0.773
Weight control	2.38	0.88	2.37	0.84	0.814
Familiarity	1.75	0.68	1.80	0.77	0.714
Ethical concern	1.85	0.78	1.81	0.76	0.801

univariate tests indicated significant differences on seven of the nine factors, $F(1,659) = 9.92$ to 57.9 , $p < 0.001$, with only *sensory appeal* and *familiarity* not differing between the sexes. For all the other scales, the ratings for women were significantly

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* ($r=0.18$, $p<0.001$) as factors influencing food choice. Among men, *mood* ($r=0.17$, $p<0.005$) and *weight control* ($r=0.25$, $p<0.001$) were positively correlated with age. Neither sex showed any association between *convenience* or *price* and age. The significance of these effects was unchanged when social desirability was taken into account using partial correlations.

The impact of income on FCQ scales was evaluated in the expectation that people with larger incomes would be less influenced by price in their food choices. The combined samples of Studies 1 and 2 were divided into three income groups: low (<£5000, $n=270$), moderate (£5000–£20 000, $n=228$) and high (>£20 000, $n=148$). Multivariate analysis of variance with income as a grouping factor and age, sex and social desirability as covariates produced a significant overall income effect, $F(18,1266)=11.9$, $p<0.0001$. Univariate analyses indicated that the income groups differed on three factors—price, sensory appeal and familiarity, $F(2,640)=3.11$ to 90.4 , $p<0.05$ (Table 5). An orderly relationship between income and the importance of price in food selection was apparent, with less emphasis being placed on price by better-off individuals. Familiarity showed the reverse effect, being rated as more important by lower income groups. Sensory appeal was rated as less important by the low-income than either the moderate- or high-income groups.

Tests of Convergent Validity

Scores on the shortened social desirability scale correlated with two of the FCQ scales: *health* ($r=0.19$, $p<0.001$) and *natural content* ($r=0.16$, $p<0.001$). This factor

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 ^a	2.79	0.69 ^b	2.09	0.65 ^c
Weight control	2.30	0.88	2.42	0.82	2.27	0.83
Familiarity	1.83	0.70 ^a	1.79	0.68 ^b	1.64	0.70 ^c
Ethical concern	1.91	0.78	2.04	0.76	1.79	0.72

In each row, cells sharing the same superscript were not significantly different on *post hoc* tests.

TABLE 6
Value of health and motives for food choice

Scale	Low health value		High health value	
	Mean	Standard deviation	Mean	Standard deviation
Health	2.72	0.71	2.96	0.70
Mood	1.98	0.74	2.25	0.74
Sensory appeal	2.86	0.63	3.06	0.58
Natural content	2.31	0.82	2.61	0.86
Weight control	2.23	0.84	2.43	0.84

was therefore taken into account when assessing relationships with other measures. In order to test the convergent validity of the scales, a number of *a priori* predictions were generated concerning associations with other questionnaires.

The Health as a Value measure was administered in both studies, with the expectation that scores would correlate with the FCQ *health* score. Health value scores averaged 4.46 in women and 4.23 in men, $t=3.17$, $df=710$, $p<0.005$. The associations with FCQ factors were analysed by dividing the population by median split into high and low value of health sub-groups. Multivariate analysis of variance with health value sub-group and sex as between-subject factors and social desirability as the covariate was then carried out. There was no significant interaction between health value and sex, but a main multivariate effect of health value was observed, $F(9,647)=5.27$, $p<0.005$. Univariate effects were significant for the FCQ *health*, *mood*, *sensory appeal*, *natural content* and *weight control* scales, $F(1,647)=7.81$ to 18.7 , $p<0.01$ (Table 6). As expected, respondents who place a high value on health had significantly greater scores on the FCQ health scale. However, they also rated mood, sensory appeal, natural content and weight control as more important. The

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, $F(1,197) = 4.69$, $p < 0.05$. FCQ *weight control* ratings also correlated with DEBQ emotional eating scores among women ($r = 0.24$, $p < 0.001$). It was also found that the FCQ *mood* scale was positively correlated with both the emotional eating ($r = 0.38$, $p < 0.001$) and external eating scales of the DEBQ.

In relation to locus of control, it was predicted that subjects with high internal MHLOC scores would be more concerned with health and the use of natural ingredients than those with less strong beliefs about personal responsibility for health. These predictions were fulfilled for both women and men with significant correlations between internal LOC scores and FCQ *health* ($r = 0.40$ and 0.29 , $p < 0.001$) and *natural content* ($r = 0.37$ and 0.16 , $p < 0.05$). Controlling for social desirability, all correlations in women remained significant, as did the associations between FCQ *health* and internal LOC in men. However, the correlation in men between internal LOC and FCQ *natural content* was no longer significant after social desirability had been taken into account.

Neuroticism as a personality disposition is associated with proneness to anxiety and stress responses. It was therefore predicted that neuroticism might correlate positively with the FCQ *mood* factor. The association was not significant for women, but was confirmed for men ($r = 0.20$, $p < 0.01$). The openness to experience factor from the NEO was predicted to correlate negatively with *familiarity*, and this effect was confirmed for both women and men ($r = -0.33$ and -0.25 respectively, $p < 0.001$). These effects remained significant after controlling for social desirability biases.

DISCUSSION

Our attempt to develop a brief questionnaire to assess perceived influences on food selection at the individual level identified nine distinct factors. Several of the factors are similar to dimensions described by other investigators, including healthfulness, taste or sensory appeal, price, convenience, and tradition or familiarity (Drenowski, 1992; Lau *et al.*, 1984; Rappaport *et al.*, 1992). Mood or affect and concern with weight control have also emerged in previous work (Hollis *et al.*, 1986; Williams *et al.*, 1987). In contrast, some potential influences on food choice, such as how filling or satisfying the food is and how much it is liked by family and friends, did not emerge as consistent factors in these analyses. The FCQ was shown to have high internal consistency in both studies. The confirmatory factor analysis

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 foodstuffs (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 the relationship between affect-related food selection and dietary disinhibition (Grunberg & Straub, 1992). Among men, the mood factor was associated with neuroticism, implying that anxiety-prone individuals may be more likely to be influenced by the desire to maintain emotional well-being through eating than are emotionally more stable men.

The *convenience* factor includes items related both to the purchase and preparation of food, while *sensory appeal* involves smell, taste and appearance. Rappaport *et al.* (1992) found that health motives were negatively correlated with convenience, while health and pleasure (sensory appeal) were unrelated. Neither finding was confirmed

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 measurement methods employed. In the comparison of income groups, the low income group rated sensory appeal as less important than did better off subjects. People with less disposable income may not be able to take taste into consideration as much as wealthier individuals, and may have to set other priorities.

The *natural content* scale reflected concern with the use of additives and the selection of natural ingredients. The correlation between the health and natural content factors was high ($r=0.59$ in Study 1 and $r=0.63$ in Study 2), suggesting a strong association between the two. Nevertheless, it would appear that general health-promoting aspects of nutrition are perceived as distinct from concerns related to toxins and the ingestion of unnatural "non-foods" added for cosmetic reasons. It can be argued that additives and artificial ingredients are frequently incorporated into foods as preservatives, and may therefore have beneficial properties in preventing consumption of foods that have decayed. It would be interesting therefore to discover whether respondents in cultures with a less jaundiced opinion of the food industry would view natural ingredients and the absence of additives so positively.

Price is an obvious influence on food choice. The cost of food is a much more important element in selection among people with low incomes compared with those that are better off (Table 5). Price was also rated as more important among women than men. In the U.K., women typically have responsibility for food shopping for the household, so may be more aware of budgetary limitations than are men with their more spontaneous pattern of food purchases. Another interesting observation is that women showing dietary restraint were less influenced by price than the unrestrained. It may be that desire to eat low calorie food outweighs considerations of cost for restrained eaters.

It was anticipated that *weight control* would emerge as a significant factor in food choice in the light of the extensive research on dietary restraint and the prevalent cultural preference for thin bodies. A significant association was observed between weight control and mood as factors influencing food choice, and this is consistent with previous research (Wardle *et al.*, 1992). The correlation of weight control with natural content ($r=0.31$ in Study 1 and $r=0.42$ in Study 2) reflects the fact that many people practising caloric restriction favour natural foods such as raw vegetables over prepared dishes. As predicted, scores on the FCQ weight control scale were higher in restrained than unrestrained women. They were unrelated to income, but were higher among respondents who stated that they valued health highly.

The eighth factor to emerge in the factor analysis was labelled *familiarity*. It included items concerning how important it is for the person to eat their accustomed diet, rather than being adventurous in food choices. A positive association between familiarity and mood was observed, suggesting that people whose dietary selection is influenced by the need to regulate stress responses also prefer familiar foods. Familiarity was one of the few factors not to differ on average between men and women. It was, however, related to age, since it appears that older people are less adventurous in their choices. Associations were also observed between familiarity and income, with significantly higher familiarity ratings among people with lower incomes. It may be that as incomes increase, people are less bound to buy only food they know about, and can afford to take greater risks with food selection. For the financially less well off, the consequences of an unfortunate choice are more severe,

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 acceptable level, so endorsing the ethical concern items was not simply a reflection of presenting a set of motives that was presumed to be socially acceptable. In the present sample, ratings of ethical concern increased with age, and were higher among women than men. This suggests that the male students who constituted the majority of the younger men in the study population were particularly unaffected by ethical issues in relation to food choice.

Sensory appeal, health, convenience and price are the most important factors on average (Table 4), with the five other factors being typically endorsed less strongly. Health is certainly not more important than other factors on average, and this supports the argument that a multidimensional approach to motives governing food choice is appropriate. The variation in the relative importance of different factors for different segments of the population may make it possible to create profiles for distinct groups. For example, price was the most important factor for the lowest income group, and sensory appeal for the better off (Table 5). Appropriate strategies for health promotion may perhaps be developed for sectors with different priorities. If, for instance, convenience takes precedence over health, then education and information about healthy food that is also readily available and easy to prepare might be of greater value than messages emphasizing health alone.

The limitations of this study must be recognized. Data were only available from the segment of the sample who returned the questionnaire, so may represent the views of individuals with an interest in food selection. The questionnaire is concerned with the factors that are perceived as relevant to food choice, and these factors do not necessarily reflect actual dietary selection behaviour. The cultural limitations of this approach to the investigation of food choice should also be recognized. The nine factors that emerged in this study were endorsed by members of a society in which a wide range of safe products are readily available and well labelled. Awareness of environmental issues is relatively high, and a substantial proportion of food is imported so issues such as country of origin are salient. Consumers are not restrained by actual shortages, or by seasonal variations to the extent that might be the case in rural, less affluent or less developed societies. Different factors might assume greater importance in other cultures, in societies that produce most of their own food, or in populations exposed to an unpredictable food supply. Nevertheless, within western urban populations, the FCQ provides the opportunity to assess a broad range of factors perceived as relevant to food selection.

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