Methods used to conduct the pan-European Union survey on consumer attitudes to physical activity, body weight and health

JM Kearney, MJ Kearney, S McElhone and MJ Gibney
Institute of European Food Studies, Trinity College, Dublin 2, Ireland

Abstract

Objective: The purpose of conducting this survey was to identify data on consumer attitudes towards and beliefs about physical activity, body weight and health among the 15 countries of the EU.

Design: A cross-sectional study to get a picture of the attitudes to physical activity, body weight and health in the EU. For this, it was considered important that samples be nationally representative so that inferences drawn from the data could be applied to the population in each country as well as to the EU population as a whole. Using a non-probability sampling method employing quota controls (and the national weight) we obtained large sample sizes from each country which were nationally representative in terms of the variables age, sex and regional distribution. To ensure samples were truly nationally representative a national weight was used when analysing the data using the same characteristics as those used to define quotas. When examining pooled estimates for the total EU sample a population weight was applied.

Results: In total, 15 239 subjects aged 15 years and upwards in the EU completed the survey. This article gives details on the methods used in carrying out the survey from design of the questionnaire to sample selection, questionnaire administration and analysis of the data. The methods and their limitations are discussed.

The purpose of conducting this survey was to identify data on consumer attitudes towards, and beliefs about, physical activity, body weight and health among the 15 countries of the EU. Data on the sociocultural and demographic differences in such attitudes will help those involved in the promotion of physical activity in the general population to develop more focused and effective campaigns. This article gives details on the methods used in carrying out the survey from the design of the questionnaire to sample selection, questionnaire administration and analysis of the data, all of which were similar to those used in an earlier pan-EU survey of consumer attitudes to food, nutrition and health[1]. Subsequent articles covering different issues from the survey will provide more details on the specific questions and their particular analyses.

Questionnaire design

A project management group developed the questionnaire. This group consisted of scientists from each member state and representatives from the food industry along with members of the Institute of European Food Studies (Appendix 1). A workshop was held to design the questionnaire firstly by reviewing existing studies on attitudes and secondly by reviewing the methodology for measuring physical activity in large population surveys. The specific objectives of this pan-EU survey were as follows.

- To identify the main attitudes to physical activity/exercise, body weight and health in different countries in the EU and among different socio-demographic groups.
- To examine the motivating factors and perceived barriers to participating in physical activity/exercise.
- To determine the current levels of participation (self-reported) in leisure-time physical activity/exercise in the EU.
- To examine the current levels of activity/inactivity at work (self-reported).
- To determine the proportion of people who are underweight, normal weight, overweight and obese in the EU based on self-reported weights and heights. Also, to determine the proportion claiming to have changed weight in the 6 months previous to the survey and the methods employed to achieve this weight change.
- To examine current and ideal body image in the EU.

Caspersen *et al.*[2] have clearly distinguished the terms physical activity, exercise and sport. For the purpose of this survey the Project Management Group decided that the terms 'physical activity/exercise' should be used in

conjunction throughout the questionnaire, thereby enabling respondents to think of leisure-time activities in their broadest sense. For this reason the term sport was purposely avoided because it has a more limited definition[2]. The timing and duration over which the survey was to be conducted throughout the 15 countries in the EU was also considered. Since participation in different leisure-time activities varies according to the season in each country it was important that the survey be conducted during the same time period in all countries and over as short a period as possible.

The final questionnaire included 12 close-ended questions and, where possible, previously validated questions were used. In addition, further information was sought from respondents on various socio-demographic characteristics. Care was taken to ensure that the data on demographic variables were comparable by collecting standardized information from respondents in the 15 member states. Information on the following sociodemographic variables was collected, being common to all 15 member states.

1. Sex = male or female
2. Age (years) = 15–24; 25–34; 35–44; 45–54 ; 55–64; 65+.
3. Education = highest level of education achieved by respondent: primary; secondary; tertiary.
4. Marital status = single; married/cohabiting; widowed/separated.
5. Number of subjects in the household = 1; 2; 3; 4; 5+.
6. Number of children in the household = 0; 1; 2; 3+.
7. Region = country-specific region.

Information on social class was also collected from respondents. However, since the criteria for defining social class differs between countries (in Denmark, Sweden, Finland, Germany and the Netherlands it is based on personal or household income, while in the other 10 member states it is based on occupation of respondent (or head of household)) it is difficult to standardize this variable. Therefore, social class could not be used comparatively across member states. Instead, for comparisons between countries, the variable 'education' (highest education level attained) was used as a measure of 'social class'.

The finalized questionnaire was translated from English into all relevant languages. These were then checked by the Project Management Group and piloted on a sample of 20 subjects in each country to ensure they had retained their original sense.

Sample selection

A market research organization, MRBI Ltd, was responsible for coordinating the fieldwork in this study. They subcontracted the survey to market research organizations operating in each member state who were involved in selecting the sample and conducting the interviews in each country (Appendix 2). All of these research organizations were members of the 'Eurobus' network operating to the same standards and procedures of marketing research set out by ICC/ESOMAR[3]. 'Eurobus' is an international group of market research organizations offering market research in all 15 member states for the purposes of carrying out cross-country surveys. An omnibus approach was used whereby respondents answer questions on several different topics from various clients in the same interview. Such surveys are frequently conducted by clients from industry to follow market trends.

The aim in this survey was to recruit nationally representative samples from each member state of approximately 1000 adults (age 15 years or more). The target sample was smaller in Luxembourg ($n = 500$) and largest in the UK ($n = 1250$ of which 250 were sampled from Northern Ireland) and Germany ($n = 1250$ of which 250 were from former East Germany and 1000 from former West Germany). Multistage stratified cluster sampling was used with quotas applied on samples in each country to ensure that they were nationally representative. The procedure involved each country being divided up into a certain number of regions or strata where the number of primary sampling units assigned to each stratum was proportional to the population size of each stratum. Sampling points (where actual subject selection occurs) were chosen from each sampling unit[4]. The number of sampling points and the procedure used to select subjects within sampling points in each country are shown in Table 1.

Since the objective in this survey was to collect nationally representative samples, quotas were used and defined in each country based on demographic factors using the most recent census data (official statistics) (Table 2). In all countries only one person per household was interviewed. In instances where there was more than one eligible person resident in a household different approaches were used in different countries to choose the person interviewed. In Denmark and Sweden, the 'next birthday' method was used; in Austria, the Kish grid was used[5]. In the remaining countries, the first eligible person to answer the door was interviewed. Within each area, names were randomly selected from the electoral register. If a named individual was not available, another subject was selected using the random route method[6].

An in-house face-to-face interview-assisted technique was used to administer the questionnaire in all countries. Flash cards containing the various response options were used. Care was taken to ensure that any

Table 1 Number of sampling points and procedures used to select subjects within each sampling point in each EU country

Country	Sampling points	Sample selection procedure
Austria	280	Within sampling point, houses selected at random. Respondents selected by Kish method
Belgium	105	Sampling points selected at random. Respondents selected at interviewer discretion to meet quota requirements
Denmark	336	In selected sampling points, a random sampling of a certain number of key addresses amongst all inhabitable addresses was carried out based on the group statistic applied by Danmarks Statistik (Central Bureau of Statistics). The group statistic contains about every 40th private household address. Respondents selected in household on 'next birthday' basis
Finland	200	Within each sampling point, four randomly selected starting points were preselected for the interviewer. From the starting point, interviewers selected respondents at their own discretion according to quota requirements
France	64	Within sampling point, respondents selected at interviewer discretion to meet quota requirements
Germany	450	A large number of sampling points were selected. Each interviewer only conducted 2–3 interviews. Within sampling point, respondents selected at interviewer discretion to meet quota requirements
Greece	125	Sampling points selected at random. Respondents selected at interviewer discretion to meet quota requirements
Ireland	100	Within sampling point, starting point selected at interviewer discretion. Random route procedure used to recruit respondents to meet quota requirements
Italy	150	Within sampling point, respondents selected at interviewer discretion to meet quota requirements
Luxembourg	50	Starting address within sampling point selected from telephone directory and five households identified by random route within sampling point. Respondents selected on basis of first person who satisfied quota requirements
Netherlands	125	Within sampling point, random route procedure used with respondents selected to meet quota requirements
Portugal	90	Within sampling point, respondents selected at interviewer discretion to meet quota requirements
Spain	80	Within sampling point, starting point selected at interviewer discretion. Random route procedure used to recruit respondents
Sweden	200	Within each sampling point, a starting address was preselected at random defined by zip codes. From the starting point, every third address was selected until a total of five interviewees were achieved per point. Respondents selected on 'next birthday' basis
UK	65	Within each sampling point, individuals selected using random location methods. Each postcode sector within the sampling point was divided into blocks of addresses in adjacent postcodes. Interviewers assigned one block of addresses for each fieldwork assignment. Within the block of addresses, they were set a target number of interviews to be achieved against quota requirements
Northern Ireland	25	Within sampling point, respondent selected at interviewer discretion to meet quota requirements

Table 2 Factors used to define quotas for sample selection to correct for national representativeness and the source of statistics in each EU country

Country	Weighting variables	Source
Austria	Age, sex, occupation, region, size of community	Austrian Central Statistics Department
Belgium	Age, sex, social class, region, urbanization level	National Institute for Statistics
Denmark	Age, sex, urbanization level	Denmark Statistics
Finland	Age, sex, region, urbanization level	Finnish Official Statistics Centre
France	Age, sex, occupation of head of household, region, size of community	INSEE (French Official Statistics)
Germany	Age, sex, household size, occupation of head of household, region, size of community	Federal Bureau of Statistics
Greece	Age, sex, region	Department of Statistics in the Ministry of Economics
Ireland	Age, sex, social class, region	Central Statistics Office
Italy	Age, sex, occupation, town size within region	National Readership Survey
Luxembourg	Age, sex, employment status (active/inactive), nationality, region	STATEC
Netherlands	Age, sex, highest level of education, region	CBS (Statistical Institute)
Portugal	Age, sex, social class, occupation, region, town size	INE (National Institute of Statistics)
Spain	Age, sex, region, town size	INE (National Institute of Statistics)
Sweden	Age, sex, region	Central Statistical Bureau
UK	Age, sex, social class, region	Office of Population Censuses and Surveys
Northern Ireland	Age, sex, social class, region	Northern Ireland Population Census

possible bias resulting from people selecting the first option on the list was avoided by sequentially reversing the order of options of the questions. Standard checking procedures of at least 10% call back in each country was used.

Analyses of data

Data entry was conducted by the market research organization which had carried out the fieldwork in each country. This was then checked by the coordinating research organization, MRBI (Ireland), before being merged into tab-delimited ASCII files and a format suitable for analysis by the statistical package for social sciences (SPSS) for Windows (version 8.0). In addition to the samples in each country being quota-controlled to make them nationally representative, responses were also weighted by demographic factors for each sampling point based on the official statistics in each country. These were the same factors as those that had been used in defining the quotas (Table 2). In Italy, the sample was weighted according to the most recent national readership survey of more than 36 000 randomly selected subjects. In any analyses of the data involving intercountry comparison, this national weighting was used. For analyses of the 'pooled' EU results, the national weighting was combined with a correction factor to account for population size, which differs considerably between the 15 EU countries (Table 3). Such a weight was important to ensure that responses from countries with smaller populations did not unduly influence the pooled results leading to biased estimates since the same sample size was selected in all countries (except Luxembourg).

Owing to the large sample size, even small differences (in the order of 2–3%) between groups were highly statistically significant ($P < 0.0001$). Greater emphasis was placed on a descriptive, rather than a formal statistical, analysis of the data by highlighting marked differences in attitudes towards physical activity as they related to various sociodemographic and cultural factors, where they would be of use in the promotion and maintenance of a physically active lifestyle. For the purpose of this survey differences in the range of 10% between groups were considered by the Project Management Group to be important.

Results

In total, 15 239 subjects in the EU were surveyed. A response rate is not reported since sampling was by non-probability methods. The sociodemographic profile for the respondents in each of the 15 countries is shown in Table 4. Interviews in all countries were completed in a 2-month period between March and the end of April 1997. Within each member state interviews

Table 3 Weighting factors for population size based on the adult population (15 years +) in each EU country[7]

Country	Population 15+ (in 000's)
Austria	6 593
Belgium	8 307
Denmark	4 329
Finland	4 130
France	46 416
Germany	68 493
Greece	8 668
Ireland	2 685
Italy	48 679
Luxembourg	334
Netherlands	12 648
Portugal	8 128
Spain	32 517
Sweden	7 141
UK (including Northern Ireland)	47 379
Total	306 447

were conducted within an approximately 2-week period. Table 5 outlines the start and finish dates in the 15 member states.

Discussion

The principal aim of this cross-sectional study was to get a picture of the attitudes to physical activity, body weight and health in the EU and among each of the 15 countries in the EU. For this, it was considered important that samples be nationally representative so that inferences drawn from the data could be inferred to the population in each country as well as to the EU population as a whole. With the non-probability sampling method, using quota controls (and national weighting), we obtained large samples from each country which were nationally representative, at least in terms of the known characteristics such as age, sex and regional distribution. To ensure samples were truly nationally representative a national weighting was used when analysing the data using the same characteristics as those used to define quotas. When examining pooled estimates for the total EU sample a population weighting was applied to avoid bias due to population size differences between countries with smaller countries getting undue emphasis. The non-probability sampling methods used in this survey prevent us from estimating a response rate.

Respondents in this survey were asked many additional questions on varying topics (depending on the clients who were involved in which particular omnibus survey). Furthermore, participants were not aware at the outset when the interviewer began the survey that was about physical activity, body weight and health. This considerably reduces the possibility for greater participation among the more health-conscious segments of the population, which might arise if volunteers were asked to participate. This is a problem which can affect many health attitude surveys and limits the extrapolation of such findings to the general population.

Because we were particularly interested in cross-country comparisons with regard to attitudes about physical activity it was important that methods of sampling, interviewing and coding be standardized to ensure comparability of the data. One of the advantages of omnibus research is that interviewers are fully trained to the same standards and that research organizations operating omnibus research conform to the same standards of marketing research. Another

Table 4a Sociodemographic profile of the subjects (%) who participated in the pan-EU survey on consumer attitudes to physical activity, body weight and health: sex and age

Country	No.	Sex		Age (years)					
		Male	Female	15–24	25–34	35–44	45–54	55–64	65+
Austria	931	44	56	12	18	17	16	19	18
Belgium	982	50	50	17	22	18	15	14	14
Denmark	1 147	48	52	14	18	19	18	12	19
Finland	979	48	52	17	20	20	19	12	12
France	1 003	48	52	16	25	24	18	17	NA
Germany	1 159	48	52	13	23	20	17	21	6
Greece	1 011	44	56	23	21	21	13	13	9
Ireland	1 001	50	50	22	20	17	15	14	12
Italy	1 000	48	52	21	19	18	16	15	11
Luxembourg	518	44	55	18	18	22	18	12	12
Netherlands	1 010	47	53	15	21	23	20	14	8
Portugal	1 007	46	54	20	20	16	16	13	15
Spain	1 000	52	48	22	20	16	12	12	18
Sweden	1 001	43	57	21	20	17	20	11	10
UK (including Northern Ireland)	1 490	46	54	12	19	20	15	13	20
EU weighted *	15 239	49	51	17	20	19	15	17	12

NA, not asked.
* Weighted according to population size.

Table 4b Sociodemographic profile of the subjects (%) who participated in the pan-EU survey on consumer attitudes to physical activity, body weight and health: education level and marital status

Country	No.	Education level			Marital status		
		Primary	Secondary	Tertiary	Single	Married	Widowed/ separated
Austria	931	29	50	21	24	62	14
Belgium	982	12	67	21	24	62	14
Denmark	1 147	71	23	6	20	62	18
Finland	979	33	57	10	23	62	15
France	1 003	17	56	27	36	52	12
Germany	1 159	48	37	15	19	69	12
Greece	1 011	27	52	21	33	62	5
Ireland	1 001	20	62	18	34	58	8
Italy	1 000	17	70	13	37	55	8
Luxembourg	518	34	45	18	24	65	11
Netherlands	1 010	6	74	20	22	68	10
Portugal	1 007	60	29	11	28	62	10
Spain	1 000	63	25	12	33	59	8
Sweden	1 001	32	42	26	46	54	NA
UK (including Northern Ireland)	1 490	6	71	23	56	28	16
EU weighted *	15 239	30	52	18	31	58	11

NA, not asked.
*Weighted according to population size

advantage of omnibus research is that it permits the sampling of large numbers of people in a relatively short period of time. Since interviews in all countries were conducted within a 6-week period (mid March to the end of April), this confined the period in question to one season. This is important because physical activity levels and types vary widely with season. It is only by doing this that we can reasonably compare responses between countries. In addition to the standardization of methods and the ability to survey large samples in short periods of time, omnibus surveys are relatively less costly as expenses are shared between a number of clients.

As well as the subjects' attitudes and perceptions to physical activity, body weight and health, self-reported measures of heights and weights, as well as physical activity (types and amounts) were also obtained. While, it would have been more desirable to actually measure heights, weights and physical activity, the costs of doing this would be prohibitive (for measures of height, weight and physical activity) and not possible using omnibus research (for measured levels of physical activity). However, since the aim of this baseline survey was to get a general picture of physical activity (attitudes and levels) and body weight (levels)

Table 4c Sociodemographic profile of the subjects (%) who participated in the pan-EU survey on consumer attitudes to physical activity, body weight and health: number of children and total number of people in households

Country	Number of children in household <15 years					Number of people in household					
	0	1	2	3+	Missing	1	2	3	4	5+	Missing
Austria	72	13	11	4	–	15	34	19	19	13	–
Belgium	72	15	10	3	–	19	33	21	20	9	–
Denmark	70	13	12	5	–	25	38	18	17	7	–
Finland	63	16	14	7	–	22	35	19	17	7	–
France	64	19	13	4	–	20	28	22	20	10	–
Germany	68	17	12	3	–	14	37	25	17	7	–
Greece	58	20	19	3	–	8	19	26	33	14	–
Ireland	45	11	18	26	–	9	20	14	24	34	–
Italy	74	16	8	2	–	7	18	30	31	14	–
Luxembourg	60	22	13	5	–	11	24	20	28	17	–
Netherlands	55	22	17	2	4	15	31	17	24	12	1
Portugal	66	22	10	2	–	8	22	26	28	16	–
Spain	68	20	9	3	–	7	20	22	28	23	–
Sweden	70	12	12	6	–	28	33	18	14	7	–
UK (including Northern Ireland)	63	15	14	8	–	17	30	20	20	13	–
EU weighted *	65	17	13	5	–	15	28	21	22	13	–

*Weighted according to population size.

Table 5 Start and finish dates for interviews in the 15 member states

Country	Fieldwork dates		
Austria	26 March	–	17 April
Belgium	7 April	–	21 April
Denmark	17 March	–	11 April
Finland	25 March	–	4 April
France	7 April	–	13 April
Germany	25 March	–	2 April
Greece	17 March	–	28 March
Ireland	1 April	–	18 April
Italy	24 March	–	18 April
Netherlands	8 April	–	22 April
Portugal	7 April	–	28 April
Spain	10 March	–	23 March
Sweden	31 March	–	8 April
UK (including Northern Ireland)	17 March	–	8 April

and their inter-relationship across the different countries in the EU, self-reported measures were considered appropriate, particularly in view of the large sample size. While the body mass index (BMI) calculated from self-reported heights and weights may be slightly lower than that calculated from actual measurements due to overestimation of height and underestimation of weight[8], in two countries (Italy and Sweden) recent studies of measured heights and weights gave similar BMI categories to those found in this survey[9,10]. Self-reported physical activity has been shown to determine adult activity patterns with moderate accuracy[11–13].

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Appendix 1: Project Management Group

Austria	Professor Dr Kurt Widhalm
	Dr Beatrice De Cruz
	Dr Karin Greger
Belgium	Dr Anne-Marie Remaut de Winter
Denmark	Dr Soren Damkjaer
	Dr Knud Larsen
Finland	Dr Raimo Lappalainen
France	Dr Ismène Giachetti
Germany	Professor Franz Zunft
	Dr Dietlinde Friebe
Greece	Professor Anthony Kafatos
	Mrs Irine Markatji
	Dr Joanna Moschandrea
Ireland	Professor Mike Gibney
	Dr John M Kearney
	Ms Sinéad McElhone
Italy	Professor Amleto D'Amicis
Luxembourg	Dr Anette Schmitt
	Dr Sylvie Paquet
Netherlands	Dr Cees de Graaf
Portugal	Professor Maria Daniel Vaz de Almeida
Spain	Professor J Alfredo Martinez
Sweden	Professor Lars Magnus Engstrom
UK	Dr Barrie M Margetts
	Dr Liz Rogers

Participants

Belgium	Mr Bart van Beeck
Ireland	Dr Mary Kearney
	Mr Michael McDonagh
Netherlands	Dr Klaas Westerterp
Northern Ireland	Dr Barbara Knox
UK	Dr Susan Jebb

Industry

Coca-Cola	Dr Sophie Castell
Golden Vale plc	Mr Conor Hyde
Greencore	Dr Alastair Morton
Group Danone	Dr J Michel Antoine
Guinness Ireland	Mr Peter Nash
Kraft Jacob Suchard	Dr Els Rogiers
Mars Confectionery	Ms Ann West
Nestlé	Dr Edward Fern
Pepsi-Cola	Dr Carol Shively
Pfizer GmbH	Dr Rainer Gildeggan
Unilever	Dr Onno Korver

Appendix 2: Market research organizations

Austria	Fessel, GfK
Belgium	Aspemar s.a.
Denmark	GfK Danmark A/S
Finland	Taloustutkimus OY
France	GfK SOFEMA International
Germany	GfK Marktforschung GmbH
Greece	Amer Nielsen Research
Ireland	MRBI Ltd
Italy	ASM Srl
Luxembourg	ILReS
Netherlands	Intomart bv
Portugal	Euroteste
Sweden	GfK Sverige AB
Spain	EMER GfK
UK	RSGB