POLISH JOURNAL OF FOOD AND NUTRITION SCIENCES
www.pan.olsztyn.pl/journal/
e-mail: joan@pan.olsztyn.pl
Pol. J. Food Nutr. Sci.
2007, Vol. 57, No. 1, pp. 115–124

FACTORS INFLUENCING THE CHOICE AND PERCEPTIONS OF YOGHURTS AMONG OLD PEOPLE LIVING IN WARSAW

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Key words: yoghurts, functional foods, older people, RGM, food choice

The aim of the study was to analyze how demographic factors (such as gender, age and education period) and health factors (such as general health, problems with heart or digestion, diabetes) influence the choice of yoghurts among people aged 65+ and what kind of perceptions of functional foods are formed by the respondents. The study was carried out in Autumn 2003 in the group of 96 Warsaw citizens, without extreme visual and/or hearing impairments. The seniors were divided into experimental groups according to gender (48 women and 48 men) and age (65–74 years old and 75+, in equal proportions). In order to determine seniors' perceptions of yoghurts a Repertory Grid Method (RGM) was used and empty packages of 5 functional and 2 conventional yoghurts were presented to the subjects in 3 triads.

In general, health aspects and taste of yoghurts were the most important factors influencing the food choice, in particular for people who were overweight or obese or suffered from heart problems. *Healthy* yoghurts were seen by most seniors as natural products, without any additives or even fruits. However, the presence of other functional ingredients such as active biocultures, fibre or vitamins were perceived as additional benefit for health. Consequently, functional yoghurts were in general perceived as healthier than conventional ones. Health expectations of seniors (especially those with heart problems) were met if fat content in yoghurts was in the range of 0.0–1.0%. Therefore, functional yoghurts, being usually low fat, were often perceived by older people as having more *proper fat content* when compared to the conventional ones. *Taste* of yoghurts was not important regardless of the fact whether the product belonged to either functional or conventional yoghurts.

INTRODUCTION

"Functional food" has become a buzz word both in nutrition research and in the food industry. The term hints of a future in which specially developed foods will protect consumers from a variety of diseases and discomforts [Katan, 1999]. Functional foods lie somewhere between medicines and conventional foods [Fox, 2003]. Therefore interest in functional food and dietary supplements is stimulated by the desire of each individual to ensure both maximum well-being and health, and, at the same time, confer a minimum risk of disease throughout the lifespan. As a consequence, a number of functional foods introduced into the market will continue to grow well into the 21st century. Nowadays, there is no doubt that the functional dairy product market is the most competitive one in Europe and Japan. In those counterparts, dairy products represent almost 65% of functional food. The most functional dairy products are those containing probiotic bacteria, frequently enriched with prebiotic carbohydrates. The main benefits claimed for such products are gastrointestinal health, *e.g.* preventing from inflammatory bowel disease and colorectal cancer; other major targets are cardiovascular health (controlling serum cholesterol level and hypertension) and osteoporosis [Fox, 2003].

Most of the research carried out on functional foods has concentrated on their potential health effects, whereas relatively little is known about consumers' responses to the products. The reactions of people may vary depending on the product type, on the function, and on the consumer segment [quoted by Saher *et al*., 2004]. Age can affect impressions of functional foods as well. General health interest in food-related matters increases with age [Roininen *et al*., 1999]. As people get older they tend to experience more food-related guilt [Wardle *et al*., 1992], place more value on healthiness of foods [Steptoe *et al*., 1995], and become more reluctant to try unfamiliar foods [Tuorila *et al*., 2001]. Due to this, it is interesting to know how the older people perceive functional foods (*e.g.* yoghurts) in regard to conventional ones.

In short, our study addressed the following questions: (1) What demographic and health factors influence yoghurt choice and perceptions? (2) What kind of perceptions of functional foods (*i.e*. yoghurts) do older people (aged 65+) form?

MATERIAL AND METHODS

Recruitment procedure. In autumn 2003, 400 older people (all of them being Warsaw citizens), aged 65+ were

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randomly selected, on the basis of a personal identification number. They were then invited by letter to participate in the study. Out of them, about 17% of seniors accepted the invitation (n=67), and another 29 persons were recruited using a snow-ball method.

Subjects. The final group of subjects consisted of 96 Warsaw citizens, without extreme visual and/or hearing impairments, aged 65+, who volunteered to participate in the study. The seniors were divided into experimental groups according to two criteria: gender and age (*i.e.* 48 women and 48 men, aged 65–74 and 75+, in equal proportions).

Prior to the study, the subjects were informed in detail about the principles of the research.

Procedure. To cover the goals of this research, the following procedure was adopted: (1) First, the subjects were inquired about their education level (period of education in years); (2) A short health questionnaire was used to assess respondents' self-perceived health and selected health problems, such as heart problems, digestive problems and diabetes; (3) A special questionnaire for Repertory Grid Method (RGM) was used to determine seniors' perceptions of functional yoghurts in comparison to conventional ones. The whole study was conducted mainly at respondents' home. Only eight seniors wished to visit a University laboratory instead.

All interviews were carried out by one trained interviewer.

Interviews. Five functional and two conventional yoghurts were selected, according to the project coordinators' recommendations (the study was part of the Food in Later Life Project, coordinated by the research center in Guildford, UK), (Table 1). The main reasons for choosing yoghurts as functional foods were as follows: yoghurts are popular and easily available in all countries participating in the study; their price varies so even not rich older people can afford buying them; yoghurts' profiles are so different that it was easy to select 7 products that met specific research criteria.

The Repertory Grid Method (RGM) required the formation of product triads and consisted of two phases of the interview: a construct elicitation and a rating for each construct [Kelly, 1955].

Since no sensory assessment was to be carried out and only personal opinions on the yoghurts were of interest to us, empty packages of 7 yoghurts were presented to the subjects.

First, the yoghurts were shortly described on separate 'profile cards'. A short description was prepared on the basis of the label information, *e.g*. the name of yoghurt, brand, size, description of functional ingredients, fat content, sucrose and fruit presence (as presented in Table 1). The price of the food products was deliberately omitted.

Secondly, the triads were composed in a fixed manner, whereby 3 yoghurts were selected randomly to form the first triad, and then, the second triad was built by randomly selecting one of the yoghurts from the first triad and adding two more random yoghurts (out of 4 remaining products). The third triad was built in the same manner. The final triads are presented in Table 2.

TABLE 2. Triads presented to the participants to elicit personal constructs.

Triad	Yoghurt symbols*
1	F-4 → F-2 → C-1
2	F-4 → C-2 → F-3
3	C-2 → F-5 → F-1

* for symbols see Table 1

Empty packages of yoghurts, together with the descriptive cards, were presented to each subject in triads, one-by-one, during a face-to-face interview, which usually lasted 1–2 h.

After seeing the first triad with respective descriptive cards, the respondent was asked to rank the three yoghurts in his/her order of preference, starting from the most preferred product (*i.e*. most likely chosen to eat). Then, the respondents were asked to justify their choice, by explaining, why they had preferred one yoghurt over the other. All answers were written down accurately by the interviewer and then, the whole procedure was repeated for the next 2 triads. After that, on the basis of respondents' opinions, a list of personal constructs was built by the interviewer. The list included all kinds of product attributes that had been earlier mentioned by the respondent. Such a procedure led to elicitation of constructs with both negative and positive preferences ("perception").

At the end of the interview, the respondent was requested

TABLE 1. Characteristics and classification of 7 yoghurts used as the examples of functional foods.

Yoghurts (symbol)	Label information				Type of packaging
	Information declared by the producer	Fat content (%)	Sucrose presence	Fruit presence	
Functional –1 (F-1)	probiotic, natural, with inulin, low fat, active biocultures*, fibre (inulin)	1.0	yes	no	pot
Functional –2 (F-2)	drinking bioyoghurt, bifido active, active biocultures*, fibre (inulin)	2.0	yes	yes	bottle
Functional –3 (F-3)	natural, active biocultures*	0.0	no	no	pot
Functional –4 (F-4)	active biocultures*, fibre (six cereals)	2.7	yes	yes	pot
Functional –5 (F-5)	natural vitality, alive cultures of lactic bacteria**, vitamin C, folic acid	0.3	yes	yes	bottle
Conventional –1 (C-1)	bioyoghurt, natural, alive cultures of lactic bacteria**	3.0	no	no	pot
Conventional –2 (C-2)	alive cultures of lactic bacteria**	3.3	yes	yes	pot

* declared lactic bacteria like *L.acidophilus*, *Bifidobacterium* and *L.casei*; ** no declaration of lactic bacteria like *L.acidophilus*, *Bifidobacterium* and *L.casei*

to score all 7 yoghurts with respect to his/her individual attributes, as elicited during the RGM session. A 5-point scale was used, with 1 regarded as "do not agree at all" and 5 as "agree extremely". If the respondent was reluctant to give an answer or did not know what to say, it was coded by the interviewer as "0".

Data analysis. The data were analyzed using SPSS v.12.0. (frequency distribution, Chi^2 test, means (±SE) and ANOVA). All reported results were adjusted as separate variables for demographic factors: age, gender and education period as well as for BMI-value, heart and digestive problems and diabetes. To this end the STATGRAPHIC PLUS 5.1. software was used.

The Principal Component Analysis (PCA) was performed in the statistical sensory package ANALSENS to show the relationship among the class constructs of yoghurt samples and to investigate specific patterns for the results.

RESULTS

Basic characteristics of subjects

In regard to both gender and age, only gender significantly affected education periods (χ^2=16.67; p≤0.001): it appeared that more men than women (70.0% *vs*. 30.0%) had university education (Table 3). Gender and age were not significantly associated with self-perceived health. At the same time, gender was significantly associated with digestive problems and diabetes (χ^2=4.00; p≤0.05 and χ^2=4.36; p≤0.05, respectively): women declared suffering from such problems more often than the men (65.5% *vs*. 34.5% for digestive problems and 76.9% *vs*. 23.1% for diabetes).

Many seniors, regardless of gender, age and education period were classified as overweight or obese.

Most of older people admitted they consumed yoghurts almost every day.

TABLE 3. Education period and health characteristics of participants (n=96).

Characteristics		Percent distribution (%)
Educational period		
≤ 12 ys		47.9
>12 ys		52.1
BMI categories		
I (underweight)	<20	0.0
II (proper weight)	20–25	23.2
III (overweight)	25–30	54.7
IV (obese)	>30	22.1
Self-perceived general health		
good (very good +good)		50.0
poor (fair+ poor)		50.0
Self-declared health problems:		
heart problems [1)]		
yes		64.6
no		35.4
digestive problems[2)]		
yes		30.2
no		69.8
diabetes		
yes		12.5
no		87.5
Yoghurt eaters		
yes		94.8
no		5.2

[1)] Such diseases as: hypertension, auricular fibrillation, cordial problems, sclerosis, circulatory problems. [2)] Such diseases as: gastric ulcers, bile reflux, typical stomach, liver problems.

Perception of functional food on the example of yoghurts

Each subject generated up to 8 different constructs. Across the whole group of subjects (n=96), the total number of different constructs elicited was 10. These 10 individual constructs were then grouped into 7 construct classes of similar characteristics or uses as given below: *healthy* (used by 95 respondents) meaning all attributes related to health directly as well as several "indirect" constructs: "natural" ("white"- without any fruits added), "proper recipe, so the yoghurt affects the body beneficially", "nutritional value", *etc*.; *proper fat content* (used by 49 respondents) as a separate construct (even if this construct has actually similar meaning as *healthy,* it is not included into the previous category, because we wanted to learn which amount of fat in yoghurts was seen as the most appropriate in seniors' opinions); *tasty* (used by 87 respondents); *proper texture* (used by 22 respondents); *trust to the manufacturer* (used by 22 respondents)*; appealing look of packaging* (used by 16 respondents), meaning all attributes connected with packaging properties, such as type, size, label, colour; *universal usage* (used by 11 respondents) meaning all attributes related to possible usage of a product as a part of many different meals/dishes (*e.g.* as ice-cream replacement).

Those attributes that were mentioned by just one or two individuals (such as: price, personal habits, Polish origin of the product, *etc*.) and could not be readily assigned to an already existing class, were considered as "*other*" (used by 9 respondents in total) and ignored in the further analysis.

The findings of the RGM (Table 4) indicated that the most frequently used attributes (up to 90% of total) given to describe the 7 yoghurts were: "*healthy"* and *"tasty"*. Slightly more than half of the respondents pointed out *"proper fat content"* as an important attribute. The remaining constructs were mentioned not so often, by less than 25% of the respondents.

Chi^2 analysis was performed in order to show how important all mentioned construct classes were (on the basis of frequency distribution), considering some demographic (gender, age and education period) and health factors (BMI, general health, heart and digestive problems and diabetes). According to Chi^2 analysis (see Table 4) demographic factors did not significantly affect any of the frequencies of construct classes, except for gender in regard to *proper fat content* and age in regard to *appealing look for packaging*. In those 2 cases women used more frequently *proper fat content* than the men. *Appealing look of packaging* was more important for younger seniors compared to the older ones. With regard to the health factors (Table 4), our subjects mentioned all construct classes with the same frequency, regardless of their self-perceived general health; on the other hand, those seniors who declared heart problems or were overweight (BMI category:

TABLE 4. Results of Chi^2 analysis of all construct class frequencies for demographic and health factors.

Construct class	Chi^2 test factor (N-frequency distribution; χ^2; p-value)															
	Demographic						Health									
	Gender; df=1 (W-woman; M-man)		Age; df=1 (Y- 65-74; O-+75ys)		Education period; df=1 (≤12ys; >12ys)		BMI categories; df=2 (II,III,IV)		General health; df=1 (G-good; P-poor)		Heart problems; df=1 (Y-yes; N-no)		Digestive problems; df=1 (Y-yes;N-no)		Diabetes; df=1 (Y-yes;N-no)	
	N_W N_M	χ^2; p-value	N_Y N_O	χ^2; p-value	$N_{\leq 12y}$ $N_{>12y}$	χ^2; p-value	N_{II} N_{III} N_{IV}	χ^2; p-value	N_G N_P	χ^2; p-value	N_Y N_N	χ^2; p-value	N_Y N_N	χ^2; p-value	N_Y N_N	χ^2; p-value
Healthy	43 52	0.85^{NS}	49 46	0.10^{NS}	45 50	0.26^{NS}	30 46 19	**11.64*** **	47 48	0.01^{NS}	62 33	**8.85****	30 65	**12.89*** **	14 81	**47.25*** **
Proper fat content	32 17	**4.59***	27 22	0.51^{NS}	27 22	0.51^{NS}	9 26 14	**9.35****	19 30	2.47^{NS}	34 15	**7.37****	14 35	**9.00****	10 39	**17.16*** **
Tasty	45 42	0.10^{NS}	44 43	0.01^{NS}	41 46	0.29^{NS}	22 46 19	**47.21*** **	44 43	0.01^{NS}	56 31	**7.18****	26 61	**14.08*** **	12 75	**45.62*** **
Proper texture	10 12	0.18^{NS}	13 9	0.73^{NS}	10 12	0.18^{NS}	7 12 3	5.55^{NS}	13 9	0.73^{NS}	12 10	0.18^{NS}	5 17	**6.55***	3 19	**11.64*** **
Trust to the manufacturer	16 0	cannot be calculated	6 10	1.00^{NS}	9 7	0.25^{NS}	4 8 4	2.00^{NS}	9 7	0.25^{NS}	10 6	1.00^{NS}	7 9	0.25^{NS}	3 13	**6.25***
Appealing look of the packaging	9 7	0.25^{NS}	12 4	**4.00***	10 6	1.00^{NS}	1 10 5	**7.63***	7 9	0.25^{NS}	9 7	0.25^{NS}	5 11	2.25^{NS}	3 13	**6.25***
Universal usage	6 5	0.09^{NS}	7 4	0.82^{NS}	7 4	0.82^{NS}	2 7 2	4.55^{NS}	8 3	2.27^{NS}	4 7	0.82^{NS}	4 7	0.82^{NS}	0 11	cannot be calculated

NS – not significant; * for p≤0.05; ** for p p≤0.01; *** for p≤0.001

TABLE 5. Results of each construct class scoring (1–5) for 7 yoghurts and F and one-way ANOVA (sample as variability source).

Construct class	F,p-value df=6	Means (SE)						
		F-1 ^	F-2 ^	F-3 ^	F-4 ^	F-5 ^	C-1 ^	C-2 ^
Healthy	7.62***	3.26 (0.10)^{cd} N=94	2.91 (0.12)^{b} N=94	3.47 (0.12)^{d} N=93	3.12 (0.13)^{bc} N=90	3.11 (0.13)^{bc} N=92	3.37 (0.10)^{cd} N=94	2.50 (0.12) ^{a} N=92
Proper fat content ^ ^	4.04***	3.22 (0.16)^{c} N=49	2.98 (0.14)^{bc} N=49	3.21 (0.22)^{c} N=48	2.59 (0.17)^{ab} N=49	3.16 (0.17)^{c} N=49	2.76 (0.17)^{abc} N=49	2.31 (0.18)^{a} N=48
Tasty	1.45 ^{NS}	3.13 (0.10) N=79	3.21 (0.13) N=80	3.02 (0.14) N=82	3.11 (0.14) N=82	2.95 (0.13) N=76	3.42 (0.10) N=84	3.05 (0.13) N=85
Proper texture	3.63**	3.36 (0.15^{bc} N=22	2.86 (0.27)^{ab} N=22	3.55 (0.18)^{c} N=22	3.23 (0.25)^{bc} N=22	2.59 (0.30)^{a} N=22	3.72 (0.18)^{c} N=22	3.59 (0.13)^{c} N=22
Trust to the manufacturer	0.95 ^{NS}	3.00 (0.33) N=20	3.00 (0.32) N=16	2.70 (0.47) N=10	2.33 (0.30) N=15	2.90 (0.32) N=21	3.00 (0.35) N=17	2.09 (0.44) N=11
Appealing look of the packing	1.99 ^{NS}	2.94 (0.32) N=16	3.68 (0.34) N=16	2.63 (0.38) N=16	3.13 (0.29) N=16	3.88 (0.26) N=16	3.13 (0.27) N=15	3.06 (0.28) N=16
Universal usage	19.90***	3.18 (0.26)^{b} N=11	1.40 (0.07)^{a} N=10	3.81 (0.30)^{bc} N=11	1.60 (0.34)^{a} N=10	1.30 (0.21)^{a} N=10	4.00 (0.21)^{c} N=10	1.60 (0.31)^{a} N=10

^ for symbols see Table 1; ^ ^ separated from construct class *healthy*; *** for p≤0.001; **for p≤0.01; NS – not significant; N – number of respondents giving scores; means sharing the same superscript are not statistically different

III) indicated such class constructs as *healthy*, *proper fat content* and *tasty* significantly more often than the subjects with no heart problems or with proper body weight (BMI category: II). The people suffering from diabetes and persons with digestive problems mentioned such attributes as *healthy*, *proper fat content* and *tasty* significantly less often when compared to the non-diabetic persons and those without any declared digestive problems.

The results of construct class scorings for all yoghurts showed (see Table 5) that there were significant differences in terms of the following construct classes: *healthy, proper fat content*, *proper texture* and *universal usage*. The function-

al yoghurt with no fat content (F-3) was considered as the *healthiest*, the same as conventional (C-1) and other functional (F-1) yoghurts. It is worth stressing that those 3 yoghurts were "white yoghurts", namely without any fruits added. Comparing the results for sample F-1 and C-1 it can be stated that the presence of sucrose in sample F-1 was not of great importance to the subjects. In older people's opinions, the natural white color of yoghurts made them healthiest, regardless of their being functional or conventional. According to the respondents, the least healthy was a conventional yoghurt with fruits added (C-2). As for *"proper fat content"* it is quite interesting to see that the most acceptable range of fat content was 0.0–1.0% (yoghurt samples: F-3 and F-1). Even if little higher amounts of fat (up to 2% – sample F-2) were also accepted to some extent. The other samples were considered as less acceptable (all products containing more than 2.0% of fat). With respect to yoghurts' texture, creamy thick consistency (for example products C-1, C-2, F-3) was more preferred in comparison to liquid consistency, suitable for drinking (F-2 and F-5). "White yoghurts" (without the addition of fruits, especially C-1 and F-3) were regarded as suitable for *universal in usage* (for example, they could replace ice-cream). These findings indicated also that even if "*taste*" was frequently mentioned, the seniors considered all seven yoghurts fairly and quite similarly tasty, regardless of products' brand or type.

The data were also analysed using the PCA (Figure 1). The results confirmed the observations described above. A model including the first two principal factors explained almost 95% of the total variance. The construct classes "*healthy"* and *"proper fat content"* were positively correlated with factor 1, whereas "*tasty"* with factor 2. Samples F-1 and F-5 could be characterized as containing *"proper amount of fat"* and F-3 was characterized as both "*healthy"* and with "*proper fat content"*. Sample C-1 was considered as "*tasty"* and *"healthy"*. The remaining three samples (F-2, F-4 and C-2) were placed on the opposite side of the figure (*i.e.* on the left side) and therefore they were negatively correlated with factor 1. The sample C-2 was located far away from the other samples, and therefore it was regarded as the least *healthy* and with improper/unacceptable fat content.

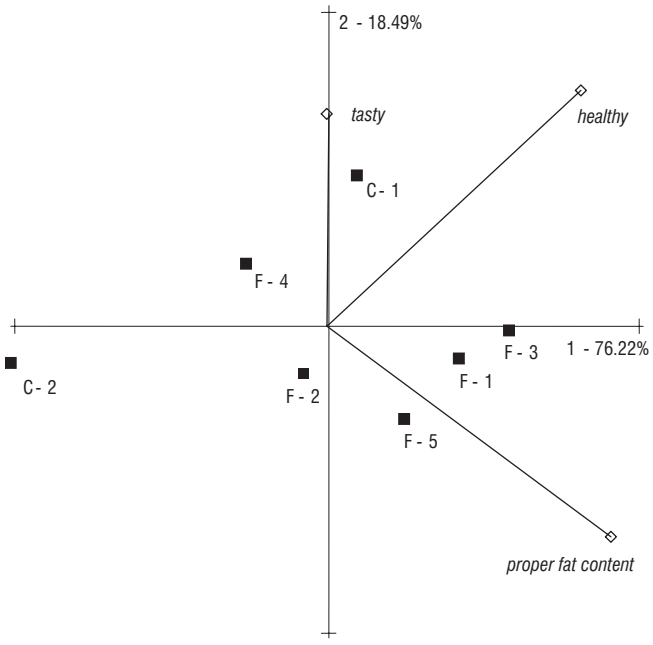

FIGURE 1. Principal component analysis (PCA) of three most frequently mentioned construct classes: *healthy*, *appropriate for fat content* and *tasty* for functional (F-1 to F-5) ^ and conventional (C-1 and C-2) ^ yoghurts (^ for symbols see Table 1).

The ANOVA analysis was performed in order to examine how varied were the subjects' perceptions of functional and conventional yoghurts. It was calculated after combining the results of five functional yoghurts and, separately, the results of two conventional yoghurts. This was made for three most often elicited construct classes, namely *healthy*, *containing proper fat content* and *tasty*. The remaining constructs were not statistically treated due to their low frequency distributions.

In general, the type of yoghurt (functional *vs.* conventional) significantly affected the scores for *healthy* and with *proper fat* content (Table 6a). Functional yoghurts were perceived as healthier and more acceptable for fat content when compared to the conventional ones. At the first sight, these findings are in line with expectations, although they might also be interpreted so that in general, functional yoghurts made seniors think of the products as being natural (without any preservatives added) and beneficially affecting body due to important functional ingredients and low fat content. Taste of 2 sets of yoghurts (functional *vs*. conventional) was in seniors' opinion similar.

In addition, another ANOVA analysis was performed in order to analyse a difference in the perceptions between functional and conventional yoghurts, in respect to demographic and health variables.

TABLE 6a. Results of three construct classes scoring for combined functional and conventional yoghurts and one-way ANOVA.

Construct class	Means (SE)		F; p-value df=1
	Functional yoghurts (F-1, F-2, F-3, F-4, F-5)	Conventional yoghurts (C-1, C-2)	
Healthy	3.18 (0.15) n=463	2.94 (0.09) n=186	5.48*
Proper fat content	3.03 (0.08) n=244	2.54 (0.12) n=97	11.40***
Tasty	3.09 (0.06) n=399	3.23 (0.06) n=169	2.01 NS

n-number of scores for functional or conventional yoghurts; NS – not significant; * for p≤0.05; *** for p≤0.001

As it can be seen in Table 6b, men in general and subjects with heart problems considered functional yoghurts as healthier than the conventional ones. Interestingly, with respect to *proper fat content,* the perception of functional and conventional yoghurts was found to vary significantly for almost all variables. For each variable, being considered as a separate one (for example, women or men, younger or older subjects, with heart or digestive problems, *etc.*) functional yoghurts were perceived as having more *proper fat content* when compared to the conventional products. These findings are in line with expectations, although they might also be interpreted so that functional yoghurts were in fact low-

TABLE 6b. Results of three construct classes scoring for combined functional and combined conventional yoghurts and ANOVA, by a particular variables considered separately.

Construct class	Variables	Yoghurt means (SE)		F; p-value df=1
		Functional	Conventional	
Healthy	Women	3.06 (0.08)	2.87 (0.12)	1.70^{NS}
	Men	3.32 (0.07)	3.02 (0.12)	**4.63***
	Younger (65-74ys)	3.24 (0.07)	2.99 (0.12)	3.46^{NS}
	Older (≥75ys)	3.10 (0.08)	2.89 (0.08)	2.13^{NS}
	With ≤12 ys of education period	3.16 (0.08)	2.93 (0.13)	2.20^{NS}
	With >12 ys of education period	3.19 (0.07)	2.95 (0.11)	3.32^{NS}
	II of BMI categories	3.29 (0.09)	2.97 (0.15)	3.48^{NS}
	III of BMI categories	3.20 (0.08)	2.92 (0.12)	3.59^{NS}
	IV of BMI categories	2.95 (0.12)	2.95 (0.19)	0.00^{NS}
	Good health	3.30 (0.07)	3.12 (0.12)	1.71^{NS}
	Poor health	3.06 (0.08)	2.79 (0.12)	3.39^{NS}
	With heart problems	3.16 (0.07)	2.77 (0.11)	**9.38****
	With digestive problems	3.21 (0.09)	2.98 (0.16)	1.57^{NS}
	Diabetes	2.61 (0.15)	2.36 (0.23)	0.89^{NS}
Proper fat content	Women	2.97 (0.10)	2.59 (0.16)	**3.91***
	Men	3.15 (0.12)	2.44 (0.19)	**10.56****
	Younger (65-74ys)	3.04 (0.11)	2.57 (0.17)	**5.41***
	Older (≥75ys)	3.02 (0.11)	2.49 (0.18)	**6.05***
	With ≤12 ys of education period	3.04 (0.11)	2.74 (0.17)	2.27^{NS}
	With >12 ys of education period	3.03 (0.12)	2.30 (0.18)	**11.42*****
	II of BMI categories	2.89 (0.19)	2.28 (0.30)	2.87^{NS}
	III of BMI categories	3.09 (0.11)	2.53 (0.17)	**7.89 ****
	IV of BMI categories	3.03 (0.15)	2.71 (0.24)	1.27^{NS}
	Good health	3.08 (0.13)	2.46 (0.20)	**6.88****
	Poor health	3.00 (0.10)	2.58 (0.16)	**4.92***
	With heart problems	3.03 (0.10)	2.37 (0.15)	**13.42*****
	With digestive problems	3.23 (0.14)	2.50 (0.22)	**7.72****
	Diabetes	2.80 (0.18)	2.50 (0.29)	0.79^{NS}
Tasty	Women	2.93 (0.09)	3.37 (0.13)	**7.67****
	Men	3.23 (0.07)	3.09 (0.11)	1.06^{NS}
	Younger (65-74ys)	3.11 (0.08)	3.29 (0.12)	1.70^{NS}
	Older (≥75ys)	3.05 (0.08)	3.16 (0.12)	0.50^{NS}
	With ≤12 ys of education period	2.88 (0.29)	2.67 (0.42)	0.18^{NS}
	With >12 ys of education period	3.09 (0.06)	3.27 (0.09)	2.85^{NS}
	II of BMI categories	3.09 (0.10)	3.17 (0.16)	0.17^{NS}
	III of BMI categories	3.18 (0.08)	3.19 (0.12)	0.01^{NS}
	IV of BMI categories	2.85 (0.13)	3.39 (0.19)	**6.00***
	Good health	3.07 (0.08)	3.18 (0.12)	0.61^{NS}
	Poor health	3.11 (0.08)	3.29 (0.12)	1.50^{NS}
	With heart problems	3.08 (0.07)	3.27 (0.11)	2.17^{NS}
	With digestive problems	3.15 (0.11)	3.23 (0.16)	0.18^{NS}
	Diabetes	2.69 (0.16)	3.43 (0.25)	**6.15***

NS – not significant; * for p≤0.05; ** for p p≤0.01; *** for p≤0.001

fat products (1.2% of fat for functional yoghurts compared to 3.2% of fat for 2 conventional products). On the other hand, and somewhat surprisingly, obese seniors (BMI category: IV) and diabetics did not see any differences between functional and conventional yoghurts in regard to fat content. Moreover, women in general and obese persons as well as diabetics perceived functional yoghurts as less tasty when compared to the conventional ones.

DISCUSSION

Functional foods differ from conventional ones in several ways. Firstly, conventional "healthy" foods are typically presented as types of foods contributing to a healthy diet, *e.g.* low-fat products, high-fibre products, without emphasising the role of any single product. In functional foods, particular components are directly connected with well-defined physiological effects and the health benefit is linked to a single product [quoted after Urala & Lähteenmäki, 2004]. Secondly, functionality creates a novelty aspect on the food without necessarily changing the sensory quality of the product. Consumers have to trust the information concerning the functional effect as the functional and conventional product can appear to be identical when used. The role of the information is crucial because consumers cannot perceive the benefit directly from the product, unlike for instance taste and

other sensory characteristics [Urala & Lähteenmäki, 2004]. Thirdly, the manufacture of functional foods often requires modern food technology, as a consequence there is a risk that functional products are perceived as being less natural than conventional products. For predicting choices of functional foods, attitudes related to health [Urala & Lähteenmäki, 2003], naturalness [quoted after Urala & Lähteenmäki, 2004] and novelty are likely to be central.

In view of our findings it is quite clear that Polish older consumers faced with both functional and conventional yoghurts, mentioned 2 attributes, namely "*healthy"* (in the meaning of natural, too) and *"with proper fat content"* as the most important factors affecting their food choice. Tuorila *et al*. [1998] stated that the elderly persons paid more attention than the young ones to such aspects as wholesomeness of the product, calories and fiber content. In addition, the study described by Roininen *et al*. [1999] confirmed that older respondents were, in general, more interested in healthy dietary practices and in using natural products than younger people. Steptoe *et al*. [1995] also confirmed a significant positive correlation between age and subjects' expressed interest in using foods that contain natural ingredients and do not contain additives. Furthermore, Guinard & Marty [1997] suggested in their study that for educated older adults, health concerns may be more important determinants of food selection than sensory attributes of foods. In particular, since the construct *"proper fat content"* in yoghurts was mentioned quite frequently by our respondents, the results of cited studies were in line with ours. Barker *et al*. [1999] found that older people were more likely to choose negative descriptors for a follower of the low-fat diet. For some consumers the fat content may be related to healthiness, which is related to a long and happy life. There is a positive impact of both physiological (like 'omega-3's increase blood circulation inlegs') and health (like 'omega-3's reduce the risk of heart disease') claims on buying intentions. Without such claims, there is little interest for enriched products [Grunert *et al*., 2000]. Similarly to other researchers [Koivisto & Sjődēn, 1996; Tuorila *et al*., 1988; Brug *et al*., 1995; Holm & Kildevang, 1996], this paper also showed that apart from health-promoting properties of yoghurts, their taste has been found to be a crucial predictor for the food consumption. In this respect, in our study the older respondents indicated the attribute "*tasty"* as the third important factor (after "*healthy*" and "*with proper fat content*"), for yoghurts choice.

Inconsistent finding has been obtained in our study when examining whether the gender or education period affected the frequency distribution of *healthy* and *tasty* constructs. Based on the results of Roininen *et al*. [1999] women and those respondents who completed 12 years of school were more interested in eating healthily and tastefully as compared to the men and respondents who had not completed 12 years of school. Similar results were obtained by Fagerli & Wandel [1999]. It should be emphasized that women reported choosing healthy foods more often than the men did. On the other hand, similarly to our results, Roininen *et al*. [1999] showed that females were also more interested in eating light products, therefore they seem to be slightly more fat-phobic compared to men.

Our results were in line with the data of Saher *et al.* [2004] and showed that functional products (yoghurts) were perceived as healthier than conventional food items. Saher *et al.* [2004] also revealed no age effects on the impressions of functional (*vs*. conventional) food users. On the other hand, in other study, gender and age, in contrast to education levels were significantly associated with the acceptance of functional foods [Verbeke, 2005]. Moreover, the findings of Tuorila *et al.* [1998] showed, the elderly persons rated their purchase interests and recommendations from friends higher when informed about fibre content, compared to the information about low calorie content. These results demonstrated that the acceptance of a new product including functional food, is affected by various factors that operate either on their own or in combination with other product, consumer or context based variables. Furthermore, the label information about some functional ingredients, such as probiotic bio-cultures, fibre or naturalness and low fat content which made yoghurts *healthy* were in general perceived as positive determinants of functional food acceptance. In addition, women tended to think that they could not counteract an otherwise unhealthy diet by using functional foods and they did not perceive functional foods to be as much a part of a healthy diet as the men did. Women were also not as ready as men to compromise on taste for a health benefit from functional foods [Urala & Lähteenmäki, 2004]. Our results reflected the aspects found in the study presented above. It should be emphasized that consumers do not perceive functional foods as one homogenous group. It depends more upon the type of functional product. General health interest does not predict the willingness to use any of the functional food products, but predicts strongly the willingness to use for example low-fat products, *i.e.* conventionally healthy products [Urala & Lähteenmäki, 2004] and this result is in line with our findings. Reduced fat content in functional yoghurts was perceived as an additional healthy benefit compared to the conventional yoghurts, provided that almost all variables were considered. It should be noted that taste of functional yoghurts compared to conventional ones was not important. In this respect, Urala & Lähteenmäki [2004] indicated that some products may have such a strong health claim that consumers are still ready to compromise on taste. On the other hand, the latest results of Verbeke [2006] showed that the willingness to compromise on taste may vary to some extent, depending on the specific product category and health benefit strength that was considered. In an earlier study of Verbeke [2005], he concluded that even though some loss of taste was observed, women and older consumers rated functional foods higher due to perceived greater health benefits. Belief in the health benefits of functional foods was found to correlate positively with functional food acceptance. As a consequence, in our study no significant differences were observed within taste scores of functional yoghurts when compared with the conventional ones.

CONCLUSIONS

1. In general, health aspects and taste of yoghurts were the most important factors influencing the food choice, in particular for people who were overweight or obese or suffered from heart problems.

2. *Healthy* yoghurts were seen by most seniors as natural products, without any additives or even fruits. However,

the presence of other functional ingredients, such as active bio-cultures, fibre or vitamins was perceived as an additional benefit for health. Consequently, functional yoghurts were in general perceived as healthier than the conventional ones.

3. Health expectations of seniors (especially those with heart problems) were met if fat content in yoghurts was in the range of 0.0–1.0%. Therefore, functional yoghurts, being usually low fat, were often perceived by older people as having more *proper fat content* when compared to the conventional ones.

4. *Taste* of yoghurts was not important regardless of the fact that the product belonged to either functional or conventional yoghurts.

5. Fat content in yoghurts was important with regard to demographic (gender, age, education period) and health factors (BMI, general health, heart problems, digestive problems).

ACKNOWLEDGEMENTS

We are deeply grateful to all older people who took part in the study.

This study has been carried out with financial support from the Commission of the European Communities, specific RTD programme “Quality of Life and Management of Living Resources”, QLK1-CT-2002-02447, “Choosing foods, eating meals: sustaining independence and quality of life in old age”. It does not necessarily reflect its views and in no way anticipates the Commission’s future policy in this area.

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Received January 2006. Revision received November and accepted December 2006.

CZYNNIKI WPŁYWAJĄCE NA WYBÓR I POSTRZEGANIE JOGURTÓW PRZEZ OSOBY STARSZE MIESZKAJĄCE W WARSZAWIE

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Aby poznać opinie osób starszych (powyżej 65 roku życia) na temat żywności funkcjonalnej (na przykładzie jogurtów) przeprowadzono jesienią 2003 roku wywiad metodą RGM (Repertory Grid Method). Badania przeprowadzono w grupie 48 kobiet w wieku 65–74 i powyżej 75 lat oraz 48 mężczyzn w wieku 65–74 i powyżej 75 lat, zamieszkałych w Warszawie. Materiał do badań stanowiły opakowania 5 jogurtów, reprezentujących żywność funkcjonalną i 2 jogurtów konwencjonalnych (tab. 1), prezentowanych respondentom losowo w trzech triadach, zgodnie z założeniami Repertory Grid Method (tab. 2).

Na podstawie uzyskanych wyników stwierdzono, o wyborze jogurtów w największym stopniu decydowały aspekty zdrowotne oraz smak, co było szczególnie widoczne wśród osób z nadwagą i otyłych oraz uskarżających się na choroby serca (tab. 4). Synonimem *zdrowych* jogurtów dla wielu badanych były produkty naturalne, bez dodatku jakichkolwiek substancji E, a nawet bez dodatku owoców. Z drugiej strony, obecność takich składników jak aktywne kultury bakterii, błonnik czy witaminy była postrzegana przez respondentów jako istotny walor prozdrowotny i w rezultacie jogurty funkcjonalne były postrzegane jako zdrowsze od konwencjonalnych. Respondenci, szczególnie cierpiący na choroby serca, preferowali jogurty o niskiej zawartości tłuszczu, od 0 do 1% (tab. 5, rys. 1), a ponieważ taką zawartością tłuszczu cechowały się głównie produkty funkcjonalne, wpłynęło to na postrzeganie tej grupy jogurtów, jako wyrobów o pożądalnej zawartości tłuszczu. Smak produktów nie był czynnikiem różnicującym jogurty funkcjonalne i konwencjonalne (tab. 6a).