

Food Preferences and Choice among the Polish Students

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Abstract

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The ratings and rankings of some, mainly product-related and consumer-related factors influencing the choice of different groups of food – vegetables, fruit, dairy products, spreads, and frying and baking fats – were evaluated among 448 Polish students. Freshness, taste and health value appeared the most important choice factors in vegetables, fruit, and spreads; freshness, taste and quality in dairy products; freshness, health value and durability in frying and baking fats. Advertising was the least important factor among all factors considered for all groups of products. The significant influences of sex on ratings of choice factors were observed. As a rule, female students scored higher almost all choice factors. The influence of pregnancy on ratings of some choice factors was noticed in dairy products. Pregnant females estimated nutritional value and fat content significantly higher. The rankings of food choice factors among males and females, or pregnant and non-pregnant women, were highly correlated.

Key words: preference; food choice factors; students

The food choice is a complex phenomenon, dependent on a lot of factors, which affect the human behaviour in a different way, resulting in the choice of some and the rejection of other products (SHEPHERD 1989; SHEPHERD & SPARKS 1994). There has been a variety of models developed to characterise the food choice factors and their interrelations (PILGRIM 1957; RANDALL & SANJUR 1981; KHAN 1981; WIERENGA 1983; SHEPHERD 1985, 1989, 1995; CONNER 1994; KEANE & WILLETS 1994; FÜRST *et al.* 1996). According to some models, the food choice factors may be divided to three groups: (i) product-related factors, which determine physical and chemical properties, sensory attributes (taste, flavour, texture), functional features (packaging, accessibility, convenience) or health value of food, etc., (ii) consumer-related factors, like personal features (age, sex, educational level), psychological factors (personality, experience, moods), physiological factors (health status, obesity, hunger), (iii) environment-related factors which include economical (price, income), cultural (beliefs) and social (fashion, society) factors. The food choice may be also characterised by the context – a situation determined by time, place, circumstances, habit, and by what and with whom is eaten (GAINS 1994).

The eating patterns and preferences of young generation, choice factors and their relationships have been discussed in a few papers. LYMAN (1989) discovered that some product-related factors, such as taste, flavour, texture, visual appearance and colour, affected the consum-

er behaviour in a complex way. FRENCH *et al.* (1994) determined the crucial role of some psychological and social variables. CUSATIS (1995) found that two factors, fat and sugar contents, were of importance to the eating behaviour of adolescents. CARDELLO (1995) and MOSKOWITZ (1995) suggested that the product quality, considered as a general idea, was important in food choice.

The different choice factors are interrelated to some extent. Especially, significance of some product-related factors may be dependent on the other consumer-related factors, like sex, and on the environment-related factors, like the existence of social sub-groups. The survey of different influences, performed in the E.U. countries, showed that the most important food choice factors were freshness and quality (74% of subjects), followed by price (43%), taste (38%), health status (32%) and habit (29%). However, the females gave higher scores to freshness, quality, price, and health status, and the males to the habit and taste. The importance of health value of the product was more obvious in two sub-groups: older persons and well-educated subjects. The unemployed and retired persons more often than others indicated price as the significant food choice factor (LENNERNÄS *et al.* 1997). LILLEY (1996) observed that older persons mainly considered such choice factors as quality, taste, health and economical status. SHEPHERD & DENNISON (1996) demonstrated the important effects of age, sex and economic group on the diets of young people. NESTLE *et al.* (1998) reported

that taste influenced the preferences and food habits more than nutritional value and product safety.

In Poland KOZŁOWSKA-WOJCIECHOWSKA and URAMOWSKA-ŻYTO (1996) showed taste to be the most important factor in choosing bread, meat, sausages, fish and cheese, whereas the nutritional value became important only in milk and fats. KOWRYGO *et al.* (1997) observed that the product-related variables were the most significant food choice factors.

The present work shows the results of some studies made on the significance of different choice factors in 5 food groups, i.e. in vegetables, fruit, dairy products, spreads, and frying and baking fats, in order to determine the influence of food group on scores of choice factors. The influences of sex (in four groups of food) and pregnancy (in dairy products) on ratings and rankings of choice factors were evaluated.

MATERIAL AND METHODS

The subjects were students of certain northern Poland universities, randomly selected. A number of the choice factors relating to five groups of products, i.e. vegetables, fruit, dairy products, spreads, and frying and baking fats, were tested. The food choice factors were selected on the basis of some preliminary small-scale tests. The subjects were asked to score every food choice factor (along with its verbal description) using the 3-point or 4-point scale, depending on food group. The choice factors were presented to the students listed in an alphabetical order. Three independent tests were made, each time using a different sample of students.

In vegetables and fruit the tests were performed using 100 students, i. e. 56 males and 44 females. The 4-point scale was applied, with categories ranging from 1 (“I never take it into account”) to 4 (“I take it into account to a great extent”). Thirteen choice factors were placed on the list.

In dairy products the survey was made among 162 female students, including 32 pregnant women. The 4-point scale, with categories as above, was applied. The subject evaluated 19 choice factors.

For spreads and frying/baking fats the test was made among 186 students (109 males and 77 females). Thirteen food choice factors for spreads and 14 factors for frying and baking fats were rated using the 3-point scale, ranging from 1 (“I do not take it into account”) to 3 (“I take it into account to an appreciable extent”).

The means \bar{x} of scores obtained for every choice factor were calculated and then rankings of choice factors were set up for each of the food groups. The significance of difference in ratings of choice factors among males and females, or among pregnant and non-pregnant women, was verified with the Student's test. Because of used category scales the non-parametric tests were applied to

analyse the obtained results: the Kendall's r_k rank-order coefficient to compare the rankings of choice factors obtained among studied sub-groups, and the Wilcoxon test to estimate the significance of difference in scores of all choice factors among males and females for vegetables and fruit.

RESULTS AND DISCUSSION

Choice Factors in Vegetables and Fruit

The results are demonstrated in Table 1. In vegetables freshness and taste appeared to be the most important factors, with advertising and fashion least important. Other choice factors, like health considerations, price, convenience and habit, were moderately taken into account ($2 < x < 3$). In fruit the principal choice factors again included freshness and taste. WANDEL & BUGGE (1997) found a similar sequence of the food choice factors in this group of foods. As for vegetables, advertising and fashion were here declared as relatively insignificant.

Choice Factors in Dairy Products

Ten out of 19 choice factors were observed to be significant ($x > 3$), as is illustrated in Table 2. The most important food choice factors included freshness, taste, quality and durability, i.e. the product-related factors, and advertising was the least significant factor.

Choice Factors in Spreads and Frying/Baking Fats

At choice of fats, freshness was the first factor in both spreads (Table 3) and frying and baking fats (Table 4). Taste was the next choice factor considered in spreads. In other fats the highest scores were assigned to some product-related factors as durability and sort of fried/baked food. KOZŁOWSKA-WOJCIECHOWSKA and URAMOWSKA-ŻYTO (1996) reported that the sensory factors, price and the health-related factors (e.g. cholesterol content) were the main factors influencing any fat choice among Polish females. BARYŁKO-PIKIELNA *et al.* (1997) showed in their study on the preference of margarines that their taste was again the main choice factor; fat content did not affect the preferences. In the present study the fat content was ranked sixth in 8 choice factors considered, so it was only moderately taken into account.

Influence of Sex

The sex of the subject influenced ratings of some food choice factors in vegetables and fruit (Table 1). The significant difference in ratings was observed only among some factors like good for health, nutritive, popular use, easy to store and visual appearance in vegetables; and good for health, price, nutritive, visual appearance, popular use and habit in fruit. Almost all choice factors obtained higher scores from females than from males in both vegetables and fruit groups, and these differences were

Table 1. Scores of choice factors for vegetables and fruit among students (4-point scale)

Food choice factor	Vegetable				Fruit			
	whole sample		males mean	females mean	whole sample		males mean	females mean
	mean	standard deviation			mean	standard deviation		
Freshness	3.81	0.39	3.82	3.79	3.76	0.43	3.71	3.82
Taste	3.67	0.47	3.64	3.70	3.76	0.43	3.71	3.82
Good for health	2.88*	0.54*	2.68*	3.14*	3.04*	0.57*	2.86*	3.27*
Price	2.80	0.47	2.75	2.86	2.84*	0.53*	2.68*	3.04*
Visual appearance	2.73***	0.49***	2.64***	2.84***	2.82**	0.56**	2.66**	3.02**
Nutritive	2.70*	0.54*	2.48*	2.98*	2.77*	0.42*	2.61*	2.98*
Accessibility	2.64	0.48	2.57	2.73	2.57	0.52	2.50	2.66
Popular use	2.60**	0.49**	2.48**	2.75**	2.50**	0.50**	2.37**	2.66**
Habit	2.53	0.50	2.46	2.64	2.41***	0.49***	2.32***	2.52***
Convenience	2.52	0.50	2.46	2.59	2.26	0.44	2.21	2.32
Easy to store	2.48**	0.52**	2.34**	2.45**	2.16	0.42	2.09	2.25
Advertising	1.39	0.49	1.36	1.45	1.39	0.49	1.41	1.36
Fashion	1.29	0.46	1.27	1.34	1.23	0.42	1.21	1.25

Significant sex difference: * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$

Table 2. Scores of choice factors for dairy products among young female students (4-point scale)

Food choice factor	Whole sample		Students non-pregnant pregnant	
	mean	standard deviation	mean	mean
Freshness	3.93	0.26	3.92	3.97
Taste	3.82	0.39	3.84	3.72
Quality	3.57	0.38	3.55	3.66
Durability	3.43	0.63	3.38	3.62
Taste additives	3.25	0.38	3.27	3.16
Good for health	3.18	0.33	3.20	3.12
Nutritional value	3.18	0.31	3.16	3.28
Nutritive	3.12**	0.88**	3.04**	3.44**
Price	3.06	0.27	3.05	3.09
Labelling	3.04	0.61	3.01	3.16
Habit	2.94	0.52	2.98	2.78
Fat content	2.88**	0.94**	2.80**	3.19**
Convenience	2.86	0.66	2.85	2.91
Visual appearance	2.70*	0.78*	2.81*	2.28*
Producer	2.64	0.85	2.60	2.81
Easy to store	2.56	0.83	2.61	2.34
New on the market	2.31**	0.99**	2.22**	2.69**
Packaging	2.24	0.91	2.31	1.97
Advertising	1.85**	0.74**	1.91**	1.59**

Significant pregnancy difference: * $p < 0.001$, ** $p < 0.05$

proved with the Wilcoxon test (at $p = 0.01$) to be significant. On the other hand, the rankings of choice factors were relatively similar ($\hat{\sigma}_K = 0.86$ at $p < 0.01$ in vegetables and 0.99 at $p < 0.001$ in fruit).

In fats (Tables 3 and 4) a number of significantly different scores of choice factors among males and females were lower: labelling, habit and fat content in spreads; good for health and sort of fried food in frying/baking fats. Female students rated almost all of them higher, except for habit. The rankings were highly correlated in spreads ($r_K = 0.71$ at $p < 0.014$) and very highly correlated in frying/baking fats (0.93 at $p < 0.001$) among male and female students.

The sex was sometimes found to be an important choice factor. The different food intake and preferences by males and females may be related to such influences as cultural habits or fashion. As is the custom, females take much less food than males, eat less meat (FIDDES 1991) and limit the energy value of food (BUTTO & WHITEHOUSE 1991). Females usually have more pronounced aversions against many kinds of food (PILGRIM 1957).

The earlier studies showed weak or moderate influence of sex on the degree of liking for a variety of food. SHENG *et al.* (1996) demonstrated that sex affected the hedonic preference of different food items to some extent. BABICZ-ZIELIŃSKA and ZAGÓRSKA (1998) observed small significant differences in the degree of liking in a number of particular vegetables and fruit items. Interestingly, females rated the major part of items higher, in spite of higher average score of vegetables among males. BABICZ-ZIELIŃSKA (1998, 1999a) showed some moderate influences

Table 3. Scores of choice factors for spreads among students (3-point scale)

Food choice factor	Whole sample		Males mean	Females mean
	mean	standard deviation		
Freshness	2.89	0.33	2.82	2.94
Taste	2.67	0.69	2.58	2.72
Good for health	2.19	0.71	2.09	2.26
Price	2.17	0.59	2.14	2.19
Labelling	2.12**	0.67**	1.96**	2.23**
Fat content	1.91***	0.71***	1.74***	2.04***
Habit**	1.91**	0.74**	2.06**	1.81**
Advertising	1.31	0.68	1.34	1.28

Significant sex difference: ** $p < 0.01$, *** $p < 0.05$

of sex in other foods. In dairy products, females preferred cottage cheese more and full-fat milk less than males; similarly in meat, chicken was more preferred and pork less preferred; and in fish, the cod was more preferred and eel was less preferred by females compared with males. In fats, BABICZ-ZIELIŃSKA and ŁYSIAK-SZYDŁOWSKA (1997) demonstrated slightly higher preference of butter to mar-

garine among spreads, of oil to margarine and lard among frying and baking fats, and of olive to mayonnaise and oil among fats used to prepare salads. MALDONADO and VILLALBI (1993) showed an apparent effect of sex on the degree of liking in their study performed among Spanish children: boys rated meat, milk and yoghurt higher, whereas fish and vegetables obtained higher ratings by girls.

On the other hand, the influence of sex on rankings of food products was negligible. High correlations between results obtained among males and female students were reported for vegetables ($r_k = 0.69$ at $p < 0.001$), fruit ($r_k = 0.73$ at $p < 0.001$), spreads ($r_k = 0.71$ at $p < 0.014$), frying and baking fats ($r_k = 0.93$ at $p < 0.001$) and different items of meat, fish and dairy products (BABICZ-ZIELIŃSKA 1998, 1999a; BABICZ-ZIELIŃSKA & ŁYSIAK-SZYDŁOWSKA 1997; BABICZ-ZIELIŃSKA & ZAGÓRSKA 1998). Among school-children (BABICZ-ZIELIŃSKA 1999b) the preference ranking for vegetables was very similar ($r_k = 0.95$ at $p < 0.001$); in fruit some important differences were noted ($r_k = 0.59$ at $p < 0.01$).

The low-fat products were chosen by 70% of females but only by 56% of males (BABICZ-ZIELIŃSKA 1998). The aversion of females to fats intake was reported by BARKER *et al.* (1995) for northern Ireland. O'DEA *et al.* (1996) noticed high preference of low-fat products among females. On the other hand, SLOAN & STIEDMANN (1995)

Table 5. Comparison of rankings and ratings of choice factors for different food

Significance of choice factor	Choice factors for different food groups				
	vegetables	fruit	dairy products	spreads	frying and baking fats
Taken into account to a great extent	freshness taste	freshness taste	freshness taste quality durability taste additives good for health nutritional value nutritive price labelling	freshness taste	freshness good for health durability
Moderately taken into account	good for health price visual appearance nutritive accessibility popular use habit convenience easy to store	good for health price visual appearance nutritive accessibility popular use habit convenience easy to store	habit fat content convenience visual appearance producer easy to store new on the market packaging	good for health price labelling fat content habit	sort of fried food health status labelling price habit
Unimportant at food choice	advertising fashion	advertising fashion	advertising	advertising	advertising
Significance levels	taken into account to a great extent $3 < x \leq 4$ moderately taken into account $2 < x \leq 3$ unimportant at food choice $1 \leq x \leq 2$			taken into account to a great extent $2.4 < x \leq 3$ moderately taken into account $1.7 < x \leq 2.4$ unimportant at food choice $1 \leq x \leq 1.7$	

observed that females preferred low-calorie rather than low-fat food.

The effect of sex on the preferred way of the culinary treatment of vegetables was also observed (BABICZ-ZIELIŃSKA & ZAGÓRSKA 1998). More females (40%) than males (13%) preferred cooked vegetables. Male (80%) rather than female (53%) students favoured a sweet taste of fruit; females preferred a sour taste (BABICZ-ZIELIŃSKA & ZAGÓRSKA 1998).

Effect of Pregnancy

The ratings of particular dairy products were similar among pregnant and non-pregnant female students. Some significant differences were only observed in a few choice factors like visual appearance, nutritive, fat content, new on the market and advertising. Pregnant women rated three of them higher – nutritive, fat content and new on the market – presumably because of their need to modify their eating habits. The ranks of choice factors were similar to a considerable extent ($r_k = 0.73$ at $p < 0.001$). Earlier study (BABICZ-ZIELIŃSKA 1999c) also showed high correlation for rankings of dairy products ($r_k = 0.75$ at $p < 0.001$) among pregnant and non-pregnant females.

Food Choice Factors – General Characteristics

The presented results demonstrate that freshness, taste, flavour and visual appearance are the most significant factors of food choice in all tested groups of food (Table 5). Some factors thus appear universal at food choice. In a study of a variety of different foods, STEWART and TINSLEY (1995) observed similar sequence of the choice factors among American students, aged 18–24 years; for 30 different food groups the visual appearance and taste were the most important choice factors, and health and energy value did not affect the eating frequency.

The significance of some choice factors may depend on attributes scarcely considered as important. PETERS *et al.* (1995) showed that in morning meals their health value and convenience were significant. In other meals the general degree of liking, which included sensory attributes, was rather considered. MEISELMAN *et al.* (1994) concluded that the effort which accompanied selection of food was mainly determined by packaging, which then constituted an important food choice factor. However, the present study has never suggested such a factor, not even in preliminary tests; this may be specific of Poland and of the developing countries. There is another country-specific difference in attitudes. DE GRAAF *et al.* (1997) demonstrated that those communities in the European Union countries, which did not see any necessity of changing their eating patterns, considered taste as very important, whereas the communities prone to change their eating habits appreciated health value of the food in question higher.

Advertising was generally denied as an important factor of food choice in whatever food group. However, a considerable number of reports on attitudes of consumers in the European Union countries (ALMEIDA *et al.* 1997; GRAAF *et al.* 1997; KEARNEY *et al.* 1997a,b; MASKILL & JONES 1995; ZUNFT *et al.* 1997) and the U.S.A. (LEVENSTEIN 1988; MEISELMAN 1984, 1994, 1996; MEISELMAN & HEDDERLEY 1994) showed that the social influences such as family, social habits, fashion and advertising did exist and may have influenced the consumer behaviour even if subjects were then aware of this factor. It is perhaps because food advertising, unlike conventional advertising, is expected to deliver to the consumers rather quasi-scientific information prepared by professionals. This is actually given to them quite frequently and affects the sales of food products, like recently yoghurts, margarines and vegetable oils in Poland.

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Souhrn

BABICZ-ZIELIŃSKA E. (2001): **Preference a výběr potravin u polských studentů.** *Czech J. Food Sci.*, **19**: 154–160.

Skupina 448 polských studentů hodnotila a podle důležitosti řadila některé faktory, především vázané na výrobek a na spotřebitele, které ovlivňují výběr různých skupin potravin – zeleniny, ovoce, mlékařenských produktů, pomazánek a tuků pro smažení a pečení. Nejdůležitějšími výběrovými faktory u zeleniny, ovoce a pomazánek byly čerstvost, chuť a význam pro zdraví, u mlékařenských produktů čerstvost, chuť a kvalita a u tuků pro smažení a pečení čerstvost, význam pro zdraví a trvanlivost. Reklama byla ve všech skupinách výrobků nejméně důležitým ze všech hodnocených faktorů. Byl pozorován statisticky významný vliv pohlaví na hodnocení výběrových faktorů. Studentky obvykle hodnotily výše téměř všechny výběrové faktory. Vliv těhotenství na hodnocení některých výběrových faktorů byl zjištěn u mlékařenských výrobků. Těhotné ženy průkazně hodnotily výše výživnou hodnotu a obsah tuku. Řazení faktorů výběru potravy podle důležitosti mezi muži a ženami, stejně jako mezi těhotnými a netěhotnými ženami bylo ve vysoké korelaci.

Klíčová slova: preference; faktory výběru potravy; studenti

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