
Consumer's sensory perception of food attributes: A survey on flavor

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Abstract: Consumer's sensory perception of food attributes plays a vital role in food preference. Sensory responses to the flavor (taste and aroma), color, and texture of food are determinants of individual food choices. A descriptive cross-sectional survey on perception of food attributes was conducted on 400 respondents (aged ≤ 40 years) to evaluate consumers' perception of flavor attributes and perceived role of chosen foods in a healthy diet. The data were collected through face to face interviews of the respondent using a pretested structured questionnaire. A non-probability sampling method was used for the survey. Among the 400 respondents, 200 were males and the rest 200 were females with majority as students (40%). The consumers were found facing difficulty in perceiving the technical terms for attributes of foods but when different Bangla vocabulary denoting flavor attributes was used then the respondents felt comfortable in understanding. About 41% of the preferred the Bangla word 'Shadgondho' to understand the concept of flavor. The correct perception of flavor ($p=0.054$) was not much dependent on the profession of respondents, but there was an association between their perception level and selection of preferred foods ($p=0.018$). Majority of the respondents (85.3%) preferred the food attribute 'fruity flavor' in selecting their foods for consumption. The respondents treated their chosen foods on flavor attributes as menial to lunch or dinner and usually ate them as snacks. About one fourth of the respondents have higher sensory perception level and food preference ability. However, in combination with other food attributes like color and texture, this association needs further investigations.

Keywords: Sensory Perception, Consumer's Preference, Food Attributes, Flavor

1. Introduction

Sensory responses to the taste, aroma, colour, and texture of foods help determine food preferences and eating habits. However, sensory responses alone cannot take as sole predictor of food choice. In reality, there are multiple links between taste perceptions, taste preferences and food preferences; food choices and amount of food consumed.

According to Lund et al, consumers are readily able to assess three major food attributes, namely texture, flavor and appearance¹. Even though flavor is frequently judged as the most important food characteristic^{2,3}. According to Murphy et al, the identification of pureed foods using only taste and odor cues does not always produce the correct answer. When the possibility to use odor cues is also removed, the task becomes even more difficult⁴. In some foods, texture may be the most important food attribute. This is likely to happen if

the food has a bland flavor or has crisp characteristics⁵.

Flavor is a complex sense which can be defined as an amalgam of taste (taste buds on the tongue), aroma (the olfactory epithelium in the nose), pain/irritation/hotness (trigeminal sensors in the mouth and nose) and mouthfeel (force sensors in the mouth). The signals from these sensors are processed both locally and centrally in the brain to yield a pattern that we associate with the flavor of a particular food⁶. Since the sensations of aroma, taste and the trigeminal sense are difficult to locate and separate analytically when eating, the term 'flavor' is used to accommodate these perceptions. Flavor perception, in most cases, is time dependent; as food changes during eating because of many different factors, like salivation and mastication⁷.

The flavor of food is one of the key factor determining food quality and acceptance. Like the West, food industries of Bangladesh should also give due importance to the sensory responses of the consumers towards new food

products. But first of all, the sensory perception of food attributes of Bangladeshi consumers should be investigated. A number of studies from our laboratory investigated consumers’ perception, attitude, belief, and intake behaviour of food and food components⁸⁻¹¹. The present study, to our best of knowledge, first on this kind was undertaken to investigate the perception and preference towards flavor targets of foods of urban Bangladeshi consumers.

2. Methods

A descriptive cross-sectional survey on perception of food attributes was conducted with 400 respondents, mainly students who were doing their study on different schools, colleges and university, such as Home Economics College, Eden College, Dhaka City College, Dhaka Women College, Mirpur University College, Mirpur Ideal College, and Mirpur Bangla College, residing at Dhanmondi, Mirpur, Uttora, Mugda, and Kafrul areas of Dhaka city. A number of graduate and post graduate service holders working in various organizations in Dhaka were also included in the study.

The data was obtained through personal interviews of each respondent on structured questionnaire including both open and close ended questions. The sociodemographic information about the respondents was also designed to collect through the questionnaire. By incorporating specific questions about knowledge of, attitude toward, and perception and preferences of foods of the respondents were collected. A non-probability sampling method was used for the survey. A pretest survey conducted among respondents of 10% of the sample size using the draft questionnaire. It facilitated to finalize the questionnaire in its practically useable form. The final questionnaire was developed carefully in terms of forms and sequence so that it can meet the study objectives successfully. The questionnaire was consisting of two parts. Part A was confined the questions relating to the socio-demographic feature. Part B was included questions relating to the respondents knowledge of, attitude toward, and perception and preferences of foods.

Descriptive statistics was reported as percentages using whole numbers. The Chi-square test was used to evaluate correlation between dependent and independent variables of the study population. Significance level was set at 0.05. Microsoft Excel worksheet was used to construct contingency tables followed by cross table statistics with the statistical package SPSS, version 11.5.

3. Results and Discussion

Nutrition education and intervention strategies aimed at improving population diets ought to consider sensory pleasure response to foods, in addition to a wide range of demographic and sociocultural variables. Besides, food industries in Bangladesh are now a visible sector of industrial development. New food products are always coming in the trays of the food shops. Since, all people have their likes and

dislikes and self believes about food, many people show specific preference and conservativeness about selecting foods. Like food industries in the developed countries, local food industries should also give due importance to the sensory responses of the consumers toward new food products.

The sensory perception of flavor attribute of food and food products of the consumers was selected for investigation. The reasons are many folds: first, traditional snack food intake is a stable component of our food behaviour; second, fast food culture is booming in our society; third, more and more people are skipping regular meals (lunch or dinner); fourth, our urban populations seem to be converging on a pattern of diet high in saturated fat, sugar, and refined foods and low in fiber - often termed the ‘Western diet’. These characteristics of the urban consumers emphasized the need of various non-conventional, ready-to-eat food and food products. Foods available in the market, therefore, need to evaluate whether they meet the sensory pleasures of the consumers. Flavor is the most desirable quality and contributes to our enjoyment of foods.

The relevant socio-demographic characteristics of the study participants presented in Table-1, shows that majority of the respondents were students (40%) and a large portion of the respondents were from middle income group (40%).

Table 1. Socio-demographic features of the respondents (n=400)

Variable	Percentage (No. of respondents)
Sex	
Male	50 (200)
Female	50 (200)
Age	
10-18	12 (48)
18-≤40	74.8 (299)
>40	13.3 (53)
Education	
Below S.S.C	6.0 (24)
S.S.C	8.5 (34)
H.S.C	23.0 (92)
Graduation	33.0 (132)
Above graduation	27.0 (108)
Others	2.5 (10)
Profession	
Students	40.0 (160)
Teacher	8.5 (34)
Govt. Service	8.0 (32)
Non govt. Service	23.8 (95)
Business	8.5 (34)
Housewife	7.3 (29)
Others	4.0 (16)
Monthly Family Income (in tk)	
<10000	26.8 (107)
10001-20000	38.3 (153)
>20000	35.0 (140)

When respondents were asked to mention their perception of flavor, considerable number of them showed preference (41%) towards the Bangla word ‘Shad-gondho’ to understand what is meant for flavor to them. They also used other Bangla vocabulary to denote flavor of food. As flavor is a combination of taste, smell and feel⁶, we used some Bangla

vocabularies used to denote flavor. Among these, 'Shadgondho' is accurate to express the notion of flavor and therefore, considered 'the correct answer' for any question related to flavor. Accordingly, the correct answer by the respondents to denote their perception of flavor ($p=0.054$) was found not much dependent on the profession of the respondents. On the other hand, there was an association

between their perception level and selection preference of food ($p=0.018$). Majority of the respondents (85.3%) preferred the food attribute 'fruity flavor' in selecting their foods for consumption. Consumers treated these foods as 'off meal' menial other than lunch or dinner and they ate them at different times of the day.

Table 2. Relationship between sex and respondent perception of flavor

Sex	Respondents perception of food in using Bangla vocabulary to denote it								Total	p value
	Shugondho	Shurov	Shadgondho	Ghran	Khushbu	Shad	Nakae Shovounoo	Beshesh gondho		
Male	27.5% (55)	6.5% (13)	38.5% (77)	4.5% (9)	3.5% (7)	7.0% (14)	2.5% (5)	10.0% (20)	100% (200)	0.134
Female	20.0% (40)	5.0% (10)	43.0% (83)	10.5% (21)	5.5% (11)	4.0% (8)	1.5% (3)	10.5% (21)	100% (200)	
Total	23.8% (95)	5.8% (23)	40.8% (183)	7.5% (30)	4.5% (30)	5.5% (22)	2.0% (8)	10.3% (41)	100% (400)	

$\chi^2 = 11.106$; $df = 7$

Table 3. Relationship between profession and respondents' perception of flavor

Profession	Distribution of correct and incorrect flavor perception of the respondents			p value
	Correct	Partial Correct	Incorrect	
Student	48.8% (78)	36.8% (59)	14.4% (23)	0.054
Teacher	29.4% (10)	58.9% (20)	11.8% (4)	
Govt. Service	46.9% (15)	40.8% (13)	12.6% (4)	
Non Govt. service	35.8% (34)	48.5% (46)	15.8% (15)	
Business	35.3% (12)	58.8% (20)	5.9% (2)	
House wife	31.2% (9)	65.4% (19)	3.4% (1)	
Others	31.3% (5)	68.7% (11)		

$\chi^2 = 40.783$; $d.f. = 35$

Table 4. Association between flavor perception and flavor preference of the respondents

Perception of flavor	How much preference of flavor				p value
	High	Medium	Little	No	
Correct	57.8% (96)	36.7% (61)	5.4% (9)	-	0.018
Partial Correct	46.9% (90)	41.7% (80)	9.9% (19)	1.6% (3)	
Incorrect	31.0% (13)	54.8% (23)	14.3% (6)	-	

$\chi^2 = 11.314$; $d.f. = 6$

Table 5. Choice of flavor by the respondents ($n=400$)

Type of flavor	Choice level [Percentage (No. of respondents)]		
	High Choice	Dislike	Medium Choice
Fruity	85.3 (341)	3.5 (14)	11.3 (45)
Milky	50.3 (201)	24.3 (97)	25.5 (102)
Spicy	45.3 (181)	25.5 (102)	29.3 (117)
Vegetable	56.3 (225)	16.3 (65)	27.5 (110)
Cereal	30.5 (122)	33.0 (132)	36.5 (146)
Beverage	51.5 (206)	20.8 (83)	27.8 (117)
Fish	52.8 (211)	24.8 (99)	22.5 (90)
Meaty	56.8 (227)	18.5 (74)	24.8 (99)
Oily	14.3 (57)	49.1 (196)	36.8 (147)
Egg	42.0 (168)	28.5 (114)	29.5 (118)
Floral	26.5 (106)	43.3 (173)	30.3 (121)

The resultant food preference patterns have a number of intrinsic factors; age is one of them. But it is always difficult to capture the dynamics of food preference of the young adults. Other factors that affect the flavor preferences include eating situation and the time of the day.

4. Conclusion

One fourth of study respondents showed correct perception of flavor which guided them to choose correctly the foods with flavor attributes they liked for. However, in combination with other food attributes like color and texture, this association needed to be evaluated in further studies.

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