

AGE RELATED SENSORY EVALUATION OF SUNFLOWER BUTTER

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Despite much research indicating changes in taste responses with the aging process, sensory evaluation has been conducted primarily with adult participants (age 21 years and above) who are selected on the basis of their availability (Meiselman, 1971). In a review of earlier psychophysical studies of human taste, Cowart (1981) found that the characteristics of sensitivity to taste and taste preferences of children and the elderly, relative to those of young adults, have been neglected. The most serious design errors in human taste research are the selection of experimental subjects and the failure to control for possible age-related variations in ability to clearly report a taste experience.

Young children's food preferences are regarded as important determinants of their eating patterns. Yet, despite this assumed importance, most researchers have not studied young children's preferences directly (Birch, 1979). Birch reported that children as young as three years of age can provide reliable, consistent information about their food preferences. Since children often reject many foods that adults enjoy, it would be of interest to know if their aversive responses to certain tastes are stronger than adults.

Taste research has been conducted on regionally produced foods including sunflower butter and spreads. Sunflower butter is important in the Midwest because of its availability and possible uses as a substitute for peanut butter (Lynch, 1981). Falk and Holm (1981) found sunflower butter to be lower in protein, fat and calories and higher in calcium, phosphorus, iron and many B-vitamins than peanut butter.

Even though some research (Dreher, et al., 1983) has indicated that adult taste panelists tend to rate peanut

butters more positively in each of the sensory attributes (color, texture, flavor) than sunflower butter, we still do not know if this is true across all age groups. In this study, the sensory quality and physical characteristics of commercial sunflower and peanut butters were evaluated by a multiage sensory evaluation panel.

METHOD

Food Samples.¹ The food samples used for this study involved standard peanut butter, old fashioned peanut butter and sunflower butter. All food samples were commercially available and purchased in Fargo, North Dakota. Only smooth food samples were used.

Taste Panelists

The taste panelists consisted of five age groups: preschool (3-6 years), junior high school (12-13 years), high school (15-17 years), adults (24-46 years), and older adults (62-85 years). Each age group, including males and females, ranged from six to 21 members. All testing was conducted in Fargo, North Dakota at the following locations: North Dakota State University, one senior citizen center, and two junior and senior level public schools.

Sensory Evaluation.

Sensory quality attributes including color, texture, flavor and overall rating were evaluated using a 5-point hedonic rating scale (1 "dislike extremely" and 5 "like extremely") (see Figure 1). General acceptance was evaluated using a modified food action scale (Amerine, Pangborn and Roessler, 1965; Johnson, 1979). Food samples were coded and served individually with water distributed between samples. Sample size consisted of 15 grams of each butter served in individual containers. Consistent testing conditions were maintained as far as possible. Means and coefficient of variation (% C.V.) were calculated for sensory scores of nutbutters across age groups.

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This research has been supported by the Research and Development Fund, College of Home Economics, North Dakota State University. The authors wish to thank Ms. Renee Oscarson for her work in collecting data for this study.

¹Product information on commercial peanut butters and sunbutter is available from the authors.

Sensory Evaluation (Preference Rating)

Sample _____
 Date _____
 Code # _____

	(Check one) Color	(Check one) Texture	(Check one) Flavor	(Check one) Over-all
☺ 5 Like extremely				
😊 4 Like Moderately				
😐 3 Neither like nor dislike				
☹ 2 Dislike Moderately				
☠ 1 Dislike extremely				

Figure 1. Preference rating scale used by all age groups.

Results and Discussion

The mean sensory scores for sunflower butter and the two peanut butters for the five age groups are presented in Figure 2. Ratings for all attributes were generally lower for sunflower butter than for either of the peanut butters. Color was rated consistently lower than the other attributes except by the preschool group. This finding supports Frances (1977) who proposes that when appearance of food is different or unattractive, a potential consumer may never experience the other two major attributes of flavor and texture. Consequently, producers of sunflower butter should consider changes in this attribute if increased acceptance of this product by potential consumers is desired.

Generally, the panelists either liked or disliked sunflower butter with few undecided. Preschool children tend to be less discriminating in their ratings of all three nutbutters. Junior high school children and adults rated the nutbutters lower than other age groups. Adult participants, more so than other age groups, were clearly more consistent in their ratings. Although the elderly rated sunflower butter lower than other age groups, they tend to rate peanut butter highly, much as preschoolers.

The % C.V. (percent variation from the mean) scores were calculated for overall scores across age groups. The range of variation was found to be 26.4 percent for peanut butters to 56.3 percent for sunflower butter. For preschool children, the range of variation was 28.5 percent for the peanut butters and 59.9 percent for the sunflower butter. The range of variation for the junior high group was 32.6 percent for the peanut butters and 59.2 percent for the sunflower butters. For senior high school adolescents, the range of variation was less, 15.5

A—Preschool
 B—Junior High
 C—Senior High
 D—Adult
 E—Senior Citizen

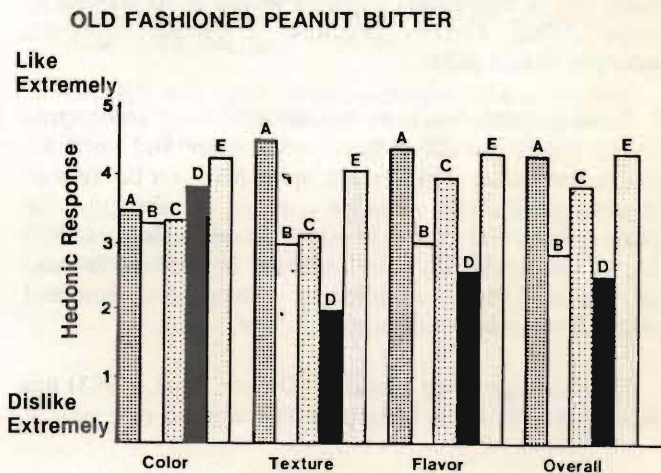
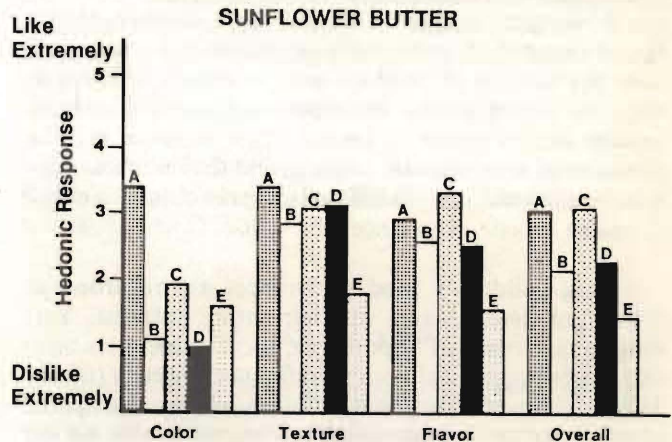
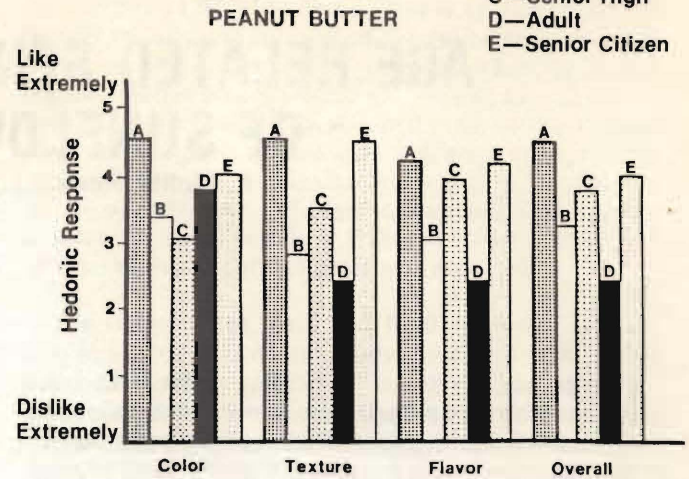


Figure 2. Hedonic responses of nut butters from different age groups.

percent for old fashioned peanut butter to 33.9 percent for sunflower butter. Adult participants ranged from 33.5 percent for peanut butters to 75.1 percent for sunflower butter. Finally, for the elderly, the range was 18.6 percent for peanut butters to 53.2 percent for sun-

Table 1
Food Action Ratings for Nutbutter Across Age Groups

Food Action Rating	Value	Peanut Butter					Old Fashioned Peanut Butter					Sunflower Butter				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
I would eat this food every opportunity I had	5	13	-	-	-	5	4	-	-	-	9	7	1	-	-	1
I would frequently eat this food	4	2	4	3	1	8	6	3	4	1	4	-	5	4	1	2
I would eat this food if available but would not go out of my way	3	2	5	5	1	8	2	6	5	1	6	3	1	1	1	1
I would hardly ever eat this food	2	-	8	1	4	-	2	5	-	4	1	2	3	2	1	6
I would eat this food only if I were forced to	1	1	1	-	-	-	4	4	-	-	1	6	8	2	3	11
Total value		80	48	29	15	81	58	44	31	15	82	54	42	22	12	39
mean		4.4	2.7	3.2	2.5	3.9	3.2	2.4	3.4	2.5	3.9	3.0	2.3	2.4	2.0	1.9
S.D.		1.1	0.9	0.7	0.8	0.8	1.5	1.0	0.5	0.8	1.2	1.8	1.4	1.3	1.3	1.3

A = Preschool
B = Junior High School
C = High School
D = Adults
E = Seniors

flower butter. The rating of sunflower butter, for all attributes, was more variable than that of peanut butter.

Food Action Ratings

In an effort to further clarify the ratings of nut-butters, participants were requested to indicate under what conditions they would eat peanut butter and sunflower butter. The frequency of these ratings, means and standard deviations for all age groups are shown in Table 1. The peanut butters were generally better accepted by the preschool and senior citizen groups. However, the sunflower butter was generally more acceptable for the preschool group than the elderly participants.

The preschool and high school groups tend to rate sunflower butter higher in the sensory attributes than all other age groups. For marketing consideration, younger age groups appear to be the most likely target groups for introducing sunflower butter. According to Falk and Holm (1981) and Dreher et al., (1983), sunflower butter is higher in calcium and phosphorus and iron but has the same protein quality as peanut butter. Due to the nutritional qualities of sunflower butter and the greater acceptance of sunflower butter by children, the introduction of this product into government sponsored preschool and elementary lunch and snack programs may assist promoting its acceptance by children in the creation of a wider market for the product.

REFERENCES

1. Amerine, M. A., Pangborn, R. M. and Roessler, E. G. **Principles of sensory evaluation of food**. New York: Academic Press, 1965.
2. Birch, L. L. Dimensions of preschool children's food preferences. **Journal of Nutrition Education**, 1979, Vol. 11, no. 2, 77-80.
3. Cowart, B. J. Development of taste perception in humans: Sensitive and preference throughout the life span. **Psychological Bulletin**, 1981, Vol. 90, No. 1, 43-73.
4. Dreher, M. L., Schantz, R. M., Holm, E. T., and Frazier, R. A. Sunflower butter: Nutritional evaluation and consumer acceptance. **Journal of Food Science**, 1983, 48:264.
5. Falk, R. S. and Holm, E. T. Preparation and taste panel acceptance of sunflower butter. **North Dakota Farm Research Journal**, 1981, 39:13.
6. Francis, F. J. **Colour and appearance as dominating sensory properties of foods. Sensory properties of foods**. Ed. G. G. Birch, J. G. Brennan, and K. J. Parker. London: Applied Science Publishers, 1977, p. 26.
7. Johnson, M. R. **Sensory evaluation for the practicing food technologist**. IFT Short Course. Chicago: Institute of Food Technologists, 1979.
8. Lynch, M. C. Would you feel good eating a sunflower-and-jelly sandwich? **Wall Street Journal**, March 11, 1981.
9. Meiselman, H. L. Effect of presentation procedure on taste intensity functions. **Perception and Psychophysics**, 1971, 10, 15-18.