

Short Communication

Consumer taste tests and milk preference in low-income, urban supermarkets

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Abstract

Objective: To explore shoppers' responses to the taste of different types of cow's milk in a blind taste test and to examine their willingness to purchase lower-fat milk as part of an in-store marketing intervention.

Design: Participants were recruited on-site in the supermarket to participate in a blind taste test of three varieties of cow's milk and asked to guess what type they sampled.

Setting: The taste testing was conducted as part of the Healthy Retail Solution (HRS) intervention that took place in four large supermarkets in Philadelphia, PA, USA over the course of six months.

Subjects: Adults (n 444) at participating Philadelphia supermarkets.

Results: The majority of participants at all stores reported typically purchasing higher-fat milk. Forty per cent of participants reported buying whole milk, 38 % purchased milk with 2 % fat. Very few participants correctly identified all three milk samples during the taste test (6.9 %) and a majority of participants were unable to identify the type of milk they self-reported typically purchased.

Conclusions: Most consumers could not accurately distinguish between various types of milk. Taste testing is a promising strategy to introduce lower-fat milks to consumers who have not tried them before. Campaigns to purchase skimmed, 1 % or 2 % milk may result in significant energy reduction over time and can serve as a simple way to combat overweight and obesity.

Keywords
Supermarkets
Low-income
Urban neighborhoods
Consumer preferences
In-store marketing

Milk is an important source of nutrients in the American diet. The 2010 Dietary Guidelines for Americans recommend that most people over the age of 9 years consume three cups of fat-free or low-fat fluid milk equivalent in milk products per day⁽¹⁾. Milk drinkers have higher intakes of several key nutrients, such as Ca and vitamin D, yet many people do not meet the Dietary Guidelines' recommendations for dairy⁽²⁾. Although 1 % fat or non-fat (skimmed) milk is recommended, a majority of the milk consumed in the USA is 2 % fat or whole-fat milk⁽³⁾.

Milk consumption is on the decline nationally, and consumption patterns vary by ethnicity⁽⁴⁾. Non-Hispanic Blacks consume less milk than non-Hispanic Whites and Mexican Americans, and Hispanics drink less milk than Whites⁽⁵⁾. Preferences for whole milk *v.* lower-fat milk have also been found to vary by income and ethnicity, with lower-income

individuals and families less likely to consume low-fat milk than higher-income ones and Hispanics more likely to consume whole milk than Whites^(6,7). In view of these patterns of milk consumption, milk – and lower-fat milk in particular – is an important product to target for health promotion and obesity prevention interventions⁽⁵⁾.

Preferences for higher-fat milk and for milk in general are based on learned preferences and individuals' beliefs about the taste of different types of milk. Some people believe that low-fat and skimmed milk are watery and have a less pleasing taste⁽⁸⁾. However, these beliefs are often based on impressions rather than experience. Because of this, blind taste testing might be a useful strategy to persuade consumers to consider buying and consuming lower-fat milk. Milk has been the focus of several public health campaigns aimed at getting

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consumers to switch from a higher-fat milk to lower-fat milk, and other studies incorporating taste testing have shown that consumers report liking the taste of skimmed and low-fat milk^(9,10). The present study builds on these results and looks at how different types of milk drinkers respond to the taste of various types of milk. The research was conducted in the context of an in-store healthy food promotion strategy that aimed to encourage low-income supermarket shoppers to shift their purchases from higher- to lower-fat milk. The current paper describes the strategy used, the ability of consumers to accurately identify the fat content of milk tasted and their reactions to the taste test.

Methods

Setting and participants

The Healthy Retail Solutions (HRS) intervention was conducted in eight (four control and four intervention) large supermarkets from two chains in Philadelphia, PA, USA⁽¹¹⁾. HRS incorporated a variety of placement and promotion in-store marketing strategies aimed to increase sales of healthier products in a profit-neutral or profit-generating manner, in urban chain supermarkets. Milk was one of five targeted categories for the broader intervention.

Stores were located in low-income, racially diverse neighbourhoods of Philadelphia (North Philadelphia, Parkside, West Philadelphia and Northwest Philadelphia). Stores had average sales attributable to the Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) of 29.2 (range: 17.2–45.0) % of total store sales. Milk taste tests were conducted one day each month for six months in the four intervention stores. To the extent possible, taste tests took place during the first two weeks of the month to outreach to customers using Supplemental Nutrition Assistance Benefits (SNAP), which are typically distributed during the first two weeks of the month in Pennsylvania.

Procedures

Each taste test was facilitated by trained study staff and sessions lasted 2 h or until twenty-five participants were recruited. On average a taste test lasted 2 min. Tables were set up in or near the milk section of the grocery store and participants were recruited as they walked by.

Shoppers were invited to participate in a milk taste test challenge where they were asked to distinguish between whole, 2%, 1% and skimmed milk. Participants were provided with a game board and three samples (2%, 1% and skimmed milk) of store-brand cow's milk in small, unmarked 3 fl oz coloured cups. Initially participants were asked 'Can you guess which type of milk is which?' and were told that cup colours had nothing to do with the types of milk they contained. After tasting each cup of

milk, participants were asked to place the cup on one of four squares on the game board (whole milk, 2% milk, 1% milk or skimmed milk) to indicate their guess as to the type of milk in the cup. Participants could change their mind at any time during the tasting. Cross-tabulations (3 × 4 table) were calculated of the actual milk type served (three varieties) *v.* participants' taste test guess (four possible guesses). The χ^2 statistics are presented in Table 1. Project staff recorded each response and then revealed the correct answers to participants. Data were also collected on the type of milk the participant typically bought and whether he/she would consider switching to lower-fat milk after participating in the taste test. After the taste tests, staff spoke to participants about the lower cost of lower-fat milk and the nutrition similarities for key nutrients such as vitamin A and Ca. All statistical analyses were performed using the statistical software package IBM SPSS Statistics version 19.0.

Results

A total of 444 customers participated in the milk taste test challenge from November 2011 through April 2012. A majority of participants across all stores typically purchased higher-fat milk (40% usually bought whole milk and 38% bought 2% milk). Fifty-one per cent of those asked agreed to participate in the taste test. Reasons for refusal were not consistently offered, but generally included I don't drink milk, I'm not interested in participating in a study and I don't have time. Shoppers were not pushed for refusal information as they shopped.

Participants had difficulty distinguishing between the different kinds of milk presented in the taste test. Of the total sample, only 6.9% of participants were able to guess all three samples correctly. Participants were most likely to guess skimmed milk correctly (50.8%), while only a quarter (24.5%) correctly identified 1% milk and about a third (32.3%) correctly identified 2% milk. Even though participants were not given samples of whole milk, 44% of participants thought that the 2% milk sample was whole milk. Table 1 shows participants' responses to each of the three milk types sampled.

While many participants expressed confidence in their ability to distinguish between types of milk, a majority of participants were not able to correctly identify the milk that they self-reported typically purchasing. Skimmed milk buyers most correctly identified the skimmed milk sample as skimmed (38.9%), while only 17.2% of 1% milk buyers correctly identified 1% milk, and about a third (34.4%) of 2% milk buyers correctly identified the 2% milk sample. None of the whole milk buyers correctly identified that whole milk was not sampled. In addition to not being able to correctly identify the milk typically purchased, participants often identified a lower-fat milk as the higher-fat variety that they typically purchased. For example, 80.8%

Table 1 Participants' guesses for each sample tested and percentage correct; blind taste tests of different types of cow's milk conducted among 444 adult shoppers at four large supermarkets in Philadelphia, PA, USA, November 2011–April 2012

	Guess (%)			
	Skimmed	1 %	2 %	Whole
Milk sample				
Skimmed (<i>n</i> 431)	50.8*	24.8	17.4	7.0
1 % (<i>n</i> 428)	12.6	24.5*	36.2	26.6
2 % (<i>n</i> 434)	8.3	15.0	32.3*	44.5

* χ^2 statistic, $P < 0.000$.

Table 2 Percentage who would consider switching by type of milk buyer; blind taste tests of different types of cow's milk conducted among 444 adult shoppers at four large supermarkets in Philadelphia, PA, USA, November 2011–April 2012

Type of milk bought	Consider switching (% yes)
1 % (<i>n</i> 32)	30.8
2 % (<i>n</i> 167)	64.7
Whole (<i>n</i> 175)	70.1
Other* (<i>n</i> 33)	22.2

*Purchase multiple types of milk.

of whole milk purchasers identified lower-fat milk (1 % or 2 %) as whole milk; more than half (54.6 %) of 2 % milk purchasers identified a lower-fat milk (1 % or skimmed) as 2 % milk; and 41.4 % of 1 % milk purchasers thought that a lower-fat milk (skimmed milk) tasted like 1 % milk. After completing the milk taste test challenge, many participants reported that they would consider switching to a lower-fat milk. About 70 % of whole milk drinkers and 65 % of 2 % milk drinkers said they would consider switching to lower-fat milk after completing the milk taste test (Table 2).

Discussion

Results of the present study indicate that most consumers could not accurately distinguish between milks of differing fat content. Milk is a product that is often purchased out of habit, and many study participants reported that they never tried a different kind of milk to the one they usually purchased. Taste testing is a promising strategy to open consumers' minds to drinking lower-fat milks. This is consistent with previous research that conducted similar taste tests^(9,12). Many participants told the study staff they were surprised to realize that they liked the taste of a lower-fat type of milk and a few went back to switch the milk in their shopping cart for a lower-fat variety.

There is also a common misconception that whole milk is healthier and contains more vitamins than other types of lower-fat milk. This fallacy was echoed by participants in the present study, many of whom referred to whole milk as 'Vitamin D' milk – as it was labelled in both of the grocery chains and commonly labelled across the country. Since

vitamin D is added as part of the fortification process, all varieties of milk contain the same amount across fat levels. In both grocery chains, price varied across the milk varieties with a gallon (3.785 litres) of whole milk averaging \$US 0.40 more than a gallon of skimmed milk. Messaging around pricing is a common strategy that grocers use to sell products and could be further incorporated into future campaigns or marketing efforts to promote sales of low-fat milk.

Energy savings from shifting from whole milk to 1 % milk are sizeable. A gallon (3.785 litres) of whole milk contains about 10 460 kJ (2500 kcal), while the same amount of 1 % milk contains just 7112.8 kJ (1700 kcal). Multiplied times a weekly purchase over the course of a year, the shift equates to an energy saving of 174 054.4 kJ (41 600 kcal). Given the comparable or even reduced cost of lower-fat milk, strategies to shift consumer perceptions about how lower-fat milk tastes are likely to support trial purchases, a prerequisite for enduring behaviour change.

Several limitations to the present study should be noted. First, the study design was not randomized and relied on a convenience sample of participants shopping in the dairy section of the store at certain times and days. Further, milk was tasted in a controlled environment and customer reactions may not accurately translate to how participants consume milk or their ability to distinguish between different types. For example, some participants noted that they do not typically drink milk by itself; rather, they use it on cereals or in baking. It is also unclear if a 3 fl oz (~89 ml) tasting is able to accurately predict a taste perception after full consumption of 8 fl oz (~237 ml) of milk. Next, the order of testing the samples was not controlled for. Participants were allowed to choose which sample they started with and could go back in forth between samples to help determine their guesses. There is a chance that tasting higher-fat milk first could alter the taste of lower-fat milk or vice versa. Further, the participants were largely low-income shoppers with low education levels, so the findings may not generalize to other more affluent or better educated groups. While the taste testing approach directly challenges consumers' assumptions by removing brand cues⁽¹³⁾, which would otherwise have likely influenced respondents' perceptions, the study is limited in that consumer purchases were not directly tracked. Data reporting on results from a larger study within which the taste tests occurred, however, found significant shifts

in purchases of low-fat milk as compared with control store milk sales⁽¹¹⁾.

The present study shows that the majority of shoppers are unable to decipher between different types of milk (skimmed, 1% fat, 2% fat, whole), despite researcher observations based on discussions that consumers believe they can distinguish between fat contents in milk. The majority of participants incorrectly identified the fat level of sampled milks and were unable to identify the type milk they typically purchased based on taste testing. Shoppers also reported liking the taste of lower-fat milks and many would consider purchasing milk with a lower content than the one they typically purchased. These encouraging taste test results highlight the potential of milk taste testing in public health interventions. To amplify study results, future efforts should consider including an incentive for immediate trial purchase, such as a coupon, and also directly track purchases at the consumer level to see if a switch is made and if that change is maintained. Many policies and programmes to switch milk consumption are focused on children and youth in schools; however, there is an opportunity to think strategically about adults in grocery stores to help shift shopping habits and consumption for the entire family. While community-focused educational media campaigns have also shown success in promoting low-fat milk consumption, utilizing milk taste testing as a point-of-purchase marketing strategy in grocery stores is a promising way to boost acceptance and sales of lower-fat milks in urban communities.

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E.D., A.C.W., G.D.F. and K.G. revised and contributed to manuscript editing; S.W. and A.K. had primary responsibility for the final content. All authors read and approved the final manuscript. *Ethics of human subject participation:* This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects/patients were approved by the Temple University. Verbal informed consent was obtained from all participants. Verbal consent was witnessed and formally recorded.

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