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FEBRUARY 1990

Marketing Research Report 8

The Importance of Cereal to Fluid Milk Consumption

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This research was supported in part by a special appropriation from the U.S. Congress administered by the U.S. Department of Agriculture.

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The Importance of Cereal to Fluid Milk Consumption

Blair J. Smith
Robert D. Yonkers¹

INTRODUCTION

Increases in the kinds, forms, and varieties of breakfast cereals have been nothing short of phenomenal in the United States in recent years. Consumption on a per capita basis is up, particularly of the ready-to-eat types of cereals. With increased cereal consumption, presumably, comes increased milk consumption -- clearly the beverage of choice in such circumstances. Total fluid milk consumption, nevertheless, has been declining for many years. The amount of milk consumed with cereal, and its relationship to total fluid milk consumption over time, is therefore of critical importance to the dairy industry.

The purpose of this publication is to report estimates of cereal consumption and of the milk consumed with that cereal. The importance of cereal in the over-all fluid milk market, and how it has changed during the last 20 years, is presented. National survey results relating demographic variables and consumer attitudes toward milk and cereal consumption are included. Finally, implications of this research for the dairy industry are developed and discussed.

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CHANGES IN CEREAL CONSUMPTION

Figure 1 shows pounds of cereal consumed per person in the United States over the 20 year period 1967-87. In 1967, U.S. citizens on average consumed 10.6 pounds of all breakfast cereals per person. The all breakfast cereals category includes everything offered for sale on the cereal-isle shelves at your grocery store, whether the product is consumed for breakfast or at some other time. This category is further divided into ready-to-eat (e.g., cold) and ready-to-cook (e.g., hot) cereals. For 1967, ready-to-eat cereals made up 79.8 percent (8.5 pounds) of this total while the remaining 2.1 pounds (20.2 percent of the total) was of the ready-to-cook variety of cereal.

Twenty years later, in 1987, total cereal consumption had risen to 15.2 pounds per person. Ready-to-eat cereals accounted for 11.6 pounds (76.3 percent of the total), with the remainder being the ready-to-cook cereals. Thus, over the twenty year period 1967-1987 total cereal consumption increased by 4.6 pounds (a 43.4 percent increase). Ready-to-eat cereal consumption increased by 36.5 percent (3.1 pounds), and ready-to-cook cereal increased by 1.5 pounds (a 71.4 percent increase).

Consumption of ready-to-eat cereal declined slightly between 1967 and 1971. This was offset by increases in ready-to-cook cereal, however, such that all breakfast cereal consumption still increased somewhat. Since 1971, neither ready-to-eat nor ready-to-cook cereal consumption has declined in any given year. While it is not the purpose of this article to examine the factors responsible for increased cereal consumption, the list of reasons

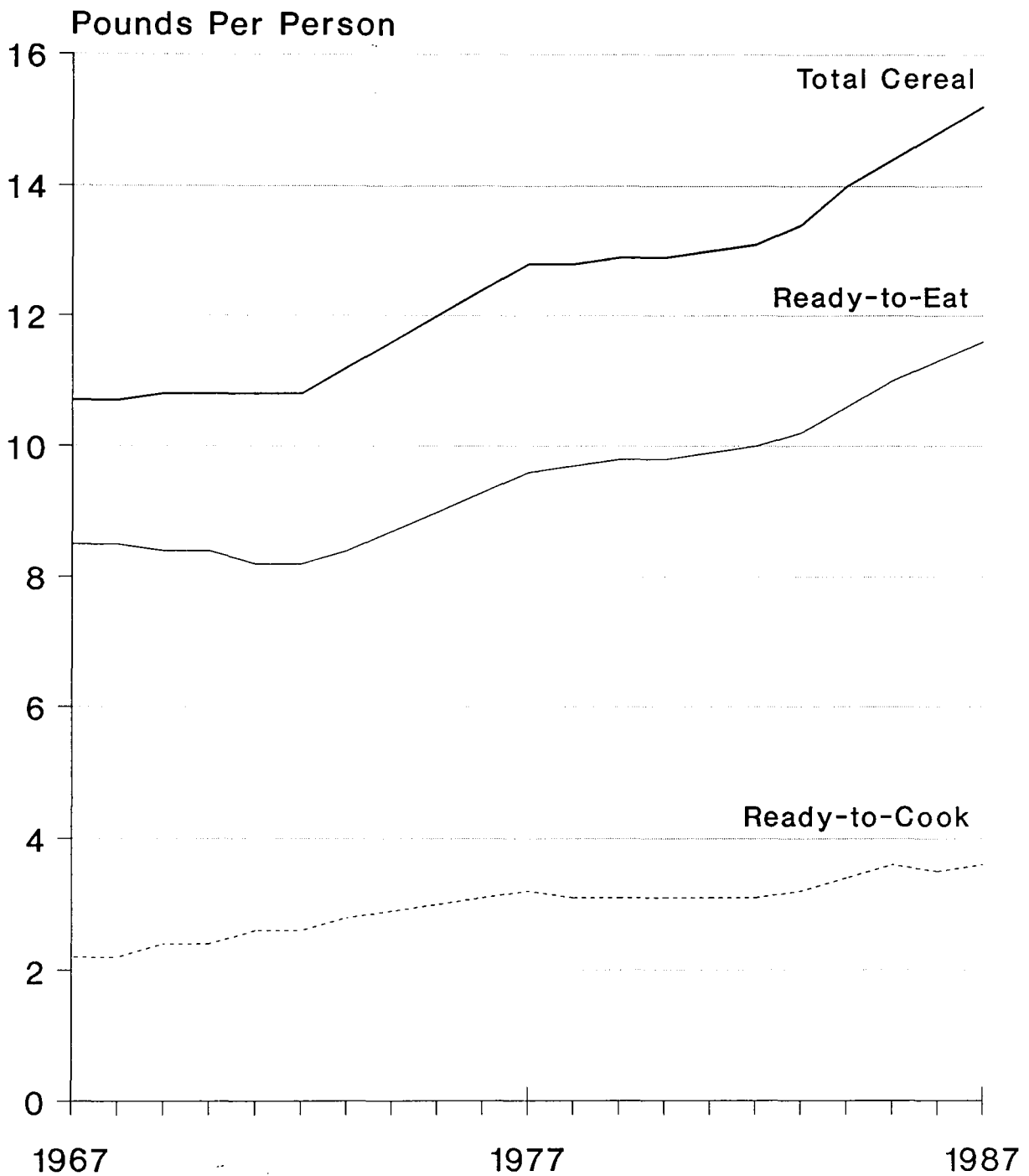


Figure 1. Pounds of Ready-to-Eat, Ready-to-Cook, and Total Cereal Consumed Per Person, United States, 1967-1987.

would include changes in consumer tastes and preferences, health concerns, and the convenience of cereals relative to other breakfast foods.

CHANGES IN MILK CONSUMPTION

Pounds of milk by type of product consumed per person in the United States during the period 1967-87 are shown in Figure 2. U.S. citizens consumed 276.0 pounds of total fluid milk per person in 1967, consisting of whole, low-fat, and skim milks. Over 80 percent (223.7 pounds) of fluid milk consumption was in the form of plain whole milk. The remaining 52.3 pounds (18.9 percent) consisted of lowfat, skim, and flavored milks. Not included in the list of fluid products are half-and-half and other, heavier creams, although some people may use them on cereal as well. Consumption of cream and cream mixtures was relatively small, however, and changed by only 0.1 pounds per person (from 4.8 to 4.7) between 1967 and 1987.

By 1987 consumption of these products had fallen to 223.5 pounds per person, a decrease of 19.0 percent. However, plain, whole milk consumption made up only 46.4 percent (103.7 pounds) of this total. 1987 marked the first time that plain, whole milk consumption in the U.S. was exceeded by the combined total of lowfat and skim milks.

During the twenty year period 1967-1987 lowfat milk consumption steadily increased to where, in 1987, it was nearly five times that of 1967. Meanwhile, plain, whole milk consumption trended downward in a steady march.

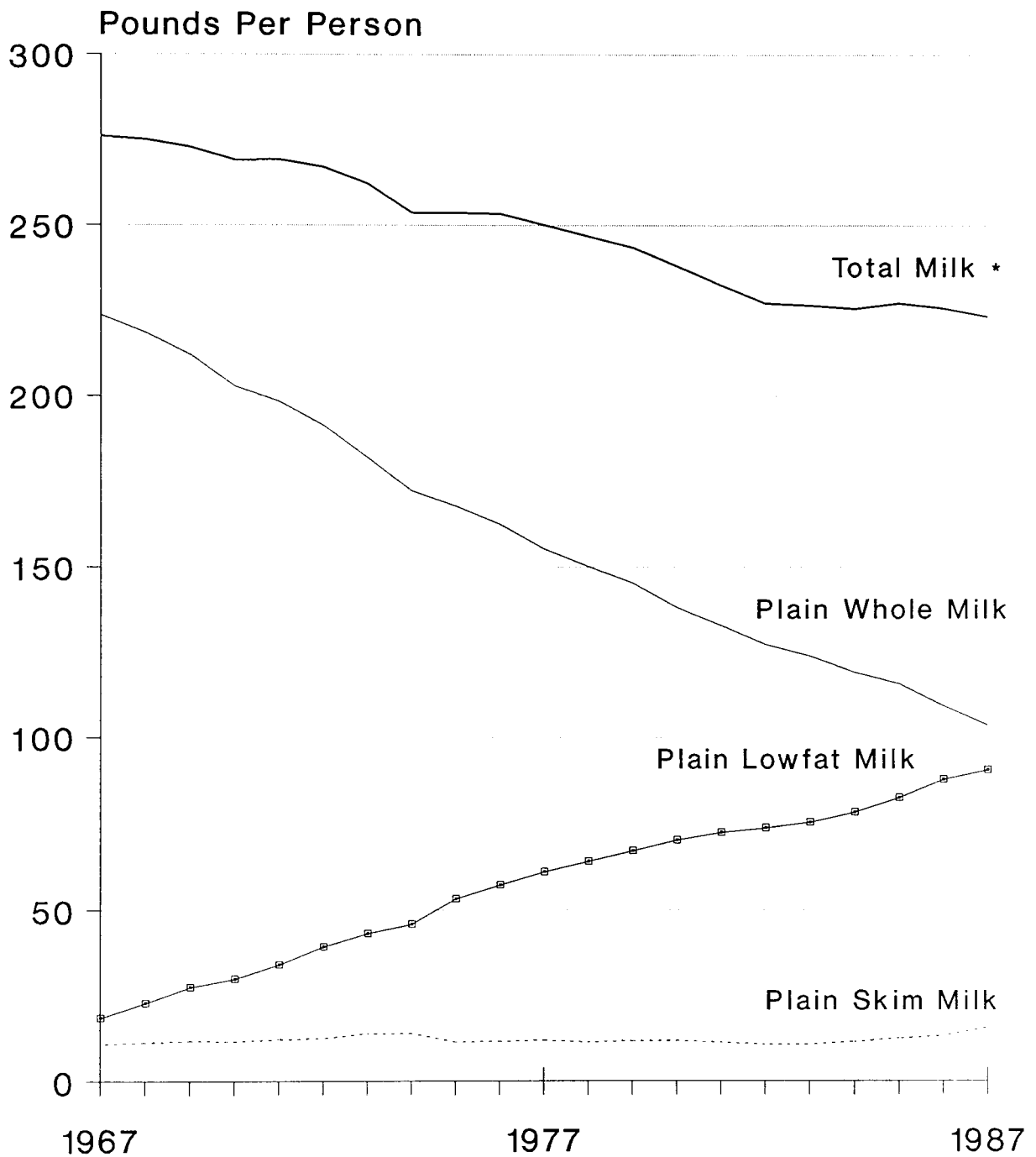


Figure 2. Pounds of Plain Whole, Lowfat, and Skim and Total Milk Consumed Per Person, United States, 1967-1987.

* Includes flavored milk and drinks and buttermilk

Skim milk consumption showed no particular direction of change throughout most of the 20 year period, although there was a small sustained increase during the last four years included in the series.

ESTIMATES OF MILK USED ON BREAKFAST CEREALS

Quantities of milk used on breakfast cereals were estimated using two different approaches. One was based on a national survey of U.S. consumers which included a question on frequency of cereal consumption. This survey was conducted by the Pennsylvania State University among 1,402 adults in 1987. A second approach was based on estimates of per capita cereal consumption regularly published by the U.S. Department of Agriculture.

Both these data sources lack key information needed for this analysis, namely the size of an average serving of cereal and the quantity of milk commonly consumed with an average serving of cereal. It was decided therefore to estimate this information using a non-random survey of faculty, staff, and students of the department in which the authors of this report are employed. The survey results indicated average serving sizes of 1.55 ounces of ready-to-eat cereal, and 6.70 ounces of milk, by weight, respectively. The ratio of milk to cereal is therefore 4.32 -- that is, for every ounce of ready-to-eat cereal eaten, 4.32 ounces of milk are consumed directly with that cereal. The primary purpose of this departmental survey was to obtain estimates of serving sizes that otherwise seemed unavailable. It was assumed serving sizes of both

cereal and milk in the national population is the same as in our sample of local persons, and our analysis was carried forward on that basis.

Estimate of Cereal-Milk Use Based on the Penn State National Survey

In the 1987 national survey, the question "How many days a week do you have milk on cereal?" was asked. Responses to this question are reported in Table 1. Note that 19.2 percent said they never use milk on cereal, and another 1.4 percent said they use it less than once a week. Both of these groups were treated as non-users and given values of zero in calculations used to compute frequency of weekly use for the entire sample of respondents.

Table 1: Frequency of Cereal Consumption,
U.S. Adult Population, 1987.

Days per week	Respondents	
	Number	Percent of total
Never or none	269	19.2
Between 0 and 1	20	1.4
1	193	13.8
2	205	14.6
3	224	16.0
4	123	8.8
5	107	7.6
6	38	2.7
7	223	15.9
Totals	1,402	100.0

Source: Penn State Study of 1,402 U.S. Adults.

These calculations consisted of summing the products of days per week and numbers of respondents in each weekly frequency, then dividing by the total number of respondents in the sample (1,402). The average frequency of cereal consumption was thus found to be 2.92 times per person per week.

The estimate of the size of an average serving of cereal and milk was based on ready-to-eat cereal only. We have no estimate of the average serving size of ready-to-cook cereal. Neither do we have an estimate of how much milk is commonly added to a serving of ready-to-cook cereal, although we suspect the ratio of milk to cereal on a weight basis is considerably lower than for the ready-to-eat varieties.

Since the national survey made no distinction between the two types of cereal, we assumed all cereals were included in the interviewees' responses. In 1987, ready-to-eat cereal was 76.3 percent of total cereal (the rest was made up of ready-to-cook cereal). To remove the ready-to-cook cereals from the national survey data, the average weekly frequency of cereal consumption estimated above (2.92) was adjusted by the ratio of ready-to-eat to all cereal $[(11.6 \div 15.2) \times 2.92]$. Therefore, the estimated number of weekly servings of ready-to-eat cereal only is 2.23.

Total pounds of milk consumed directly with ready-to-eat cereal in 1987 was then estimated by multiplying 1.55 (ounces of cereal per serving) by 4.32 (ounces of milk per ounce of cereal) by 2.23 (cereal servings per week) by 52 (weeks per year). Thus, total milk used annually on ready-to-eat cereals was 776.5 ounces, or 48.5 pounds per person, in 1987.

Estimate of Cereal-Milk Use Based on USDA Consumption Data

The U.S. Department of Agriculture reported ready-to-eat cereal use at 11.6 pounds per person in 1987, which is equivalent to 185.6 ounces. Dividing this by 1.55 (our estimate of ounces of cereal per serving) results in 119.7 average number of servings of cereal per person per year. In the Penn State survey, average number of servings of ready-to-eat cereal was 116.0 (2.23 times per week x 52). The similarity of these two values indicates that the estimate of average size of serving of cereal derived from our non-random, departmental survey may well apply to the U.S. as a whole.

Milk used on ready-to-eat cereal based on USDA consumption data was therefore estimated to be 802.0 ounces (119.7 servings per year x 1.55 ounces of cereal per serving x 4.32 ounces of milk per ounce of cereal) per person per year, or 50.1 pounds. This final figure should be compared directly to the figure 48.5 based on the Penn State study reported above. The average of these two estimates of milk used on ready-to-eat cereal (49.3) was used as the basis for estimating the changing importance of cereal-milk to total fluid milk consumption over time. Therefore, the 11.6 pounds of ready-to-eat cereal that U.S. consumers ate in 1987 was associated with 49.3 lbs. of milk, or 4.25 pounds of milk per pound of cereal ($49.3 \div 11.6$). For lack of better information, it was assumed that the average size of a serving of cereal, and the amount of milk used on that cereal, did not change between 1967 and 1987.

CHANGES IN THE IMPORTANCE OF CEREAL-MILK

Table 2 shows ready-to-eat cereal consumption during the 20 year period 1967-87. Related to that are our estimates of cereal-milk consumption, and cereal-milk as a percent of all fluid milk consumption.

The increasing importance of cereal-milk consumption is clear and unmistakable. Cereal-milk consumption was estimated to have increased 36.6 percent in absolute terms (from 36.1 to 49.3 pounds per person), while total fluid milk consumption was down by 19.0 percent (from 276.0 to 223.5 pounds) over the 20 year period. Fluid milk consumption other than that used on ready-to-eat cereals (a residual value) was down 27.4 percent (174.2 versus 239.9). Thus, increases in cereal-milk consumption (13.2 pounds during 1967-87) offset 20.1 percent of the reduction in fluid milk consumption in non-cereal uses (65.7 pounds during 1967-87).

The importance of cereal-milk consumption to total fluid milk consumption appears to have increased more rapidly in recent years. For the five-year period 1982-87, increases in cereal-milk consumption (6.8 pounds) offset 64.8 percent of the decrease in non-cereal milk uses (10.5 pounds) that took place during that time. Trends in consumption of cereal-milk, fluid milk other than for use on cereal, and fluid milk for all uses are shown in Figure 3. Non-cereal milk decreased most rapidly, but because of increasing cereal consumption, total fluid milk consumption decreased at a slower rate. Cereal-milk consumption generally increased at an increasing rate. That is, the increases in consumption were greater and greater each year.

Table 2: Cereal, Total Milk, and Cereal-Milk Consumption, United States, 1967-87.

Year	Ready-to-eat cereal consumed ^{a/}	Total fluid milk consumed, all purposes ^{a/}	Milk used on ready-to-eat cereal ^{b/}	Cereal milk as a percent of all milk
	(- - - - - pounds per person - - - - -)			(percent)
1967	8.5	276.0	36.1	13.1
1968	8.5	275.1	36.1	13.1
1969	8.4	272.9	35.7	13.1
1970	8.4	269.1	35.7	13.3
1971	8.2	269.4	34.9	13.0
1972	8.2	267.1	34.9	13.1
1973	8.4	262.3	35.7	13.6
1974	8.7	253.7	37.0	14.6
1975	9.0	253.8	38.3	15.1
1976	9.3	253.4	39.5	15.6
1977	9.6	250.2	40.8	16.3
1978	9.7	246.8	41.2	16.7
1979	9.8	243.7	41.7	17.1
1980	9.8	238.2	41.7	17.5
1981	9.9	232.5	42.1	18.1
1982	10.0	227.2	42.5	18.7
1983	10.2	226.7	43.4	19.1
1984	10.6	225.7	45.1	20.0
1985	11.0	227.3	46.8	20.6
1986	11.3	225.8	48.0	21.3
1987	<u>11.6</u>	<u>223.5</u>	<u>49.3</u>	<u>22.1</u>
Change 1967-87	+3.1	-52.5	+13.2	+9.0

^{a/} Source: Putnam, Judith Jones. Food Consumption, Prices, and Expenditures, 1966-87, Statistical Bulletin No. 773, ERS, US Dept. of Agriculture, Washington, DC. January 1989.

^{b/} Sources of data and computational procedures are described in the text of this article.

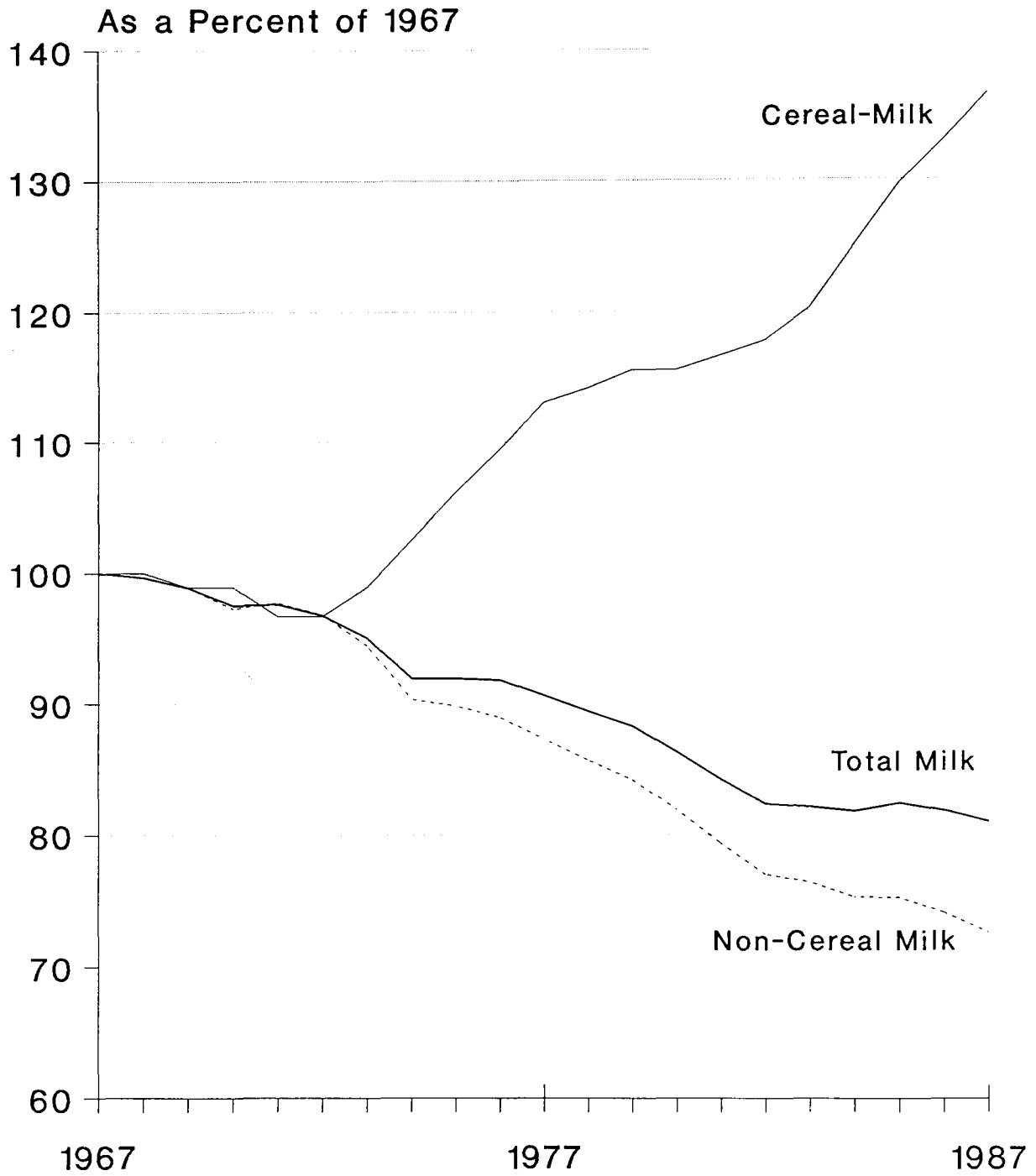


Figure 3. Trends in Cereal-Milk, Non-Cereal Milk, and Total Milk Consumed Per Person in the U.S., 1967-1987.

FREQUENCY OF DRINKING MILK AND MILK USE ON CEREAL

In the Penn State study, interviewees were asked "Do you use milk on cereal?". Table 3 is a summary of their responses. It can be seen here again (as in Table 1) that 19.2 percent of the respondents never used milk on cereal (we don't know if they ever consumed cereal in some other way). Likewise, 17.4 percent of all persons interviewed said they never drank milk. About half of those people did have milk on cereal at least once a week, however, leaving only 8.9 percent that neither drank milk nor ever had it on cereal. For 8.5 percent of the people studied their only use of milk (aside from its possible use in cooking, as pet food, etc.) was on cereal. As one might suspect, the frequency with which respondents drank milk and the frequency with which they used milk on cereal were highly related in a direct (positive) way.

Table 3: Frequency of Drinking Milk and Frequency of Milk Use on Cereal

Do you ever use milk on cereal?	Do you drink milk at least once in a while?		
	YES	NO	TOTAL
	-----percent-----		
YES	72.3	8.5	80.8
NO	10.3	8.9	19.2
TOTAL	82.6	17.4	100.0

Source: Penn State study of 1,402 U.S. adults.

VARIABLES RELATED TO CEREAL-MILK CONSUMPTION

The magnitude and direction of the relationships between frequency of cereal-milk use and several other variables of interest were estimated using Chi-square and correlation techniques. These results are summarized in Table 4. There are very strong positive relationships between use of cereal-milk and efforts to eat or drink foods high in fiber and calcium. Ready-to-eat breakfast cereals are the most highly advertised sources of fiber. Milk, of course, is the most highly promoted source of calcium, so the two go hand-in-hand. The correlation between frequency of drinking milk and milk use on cereal was discussed in the section immediately above.

The more frequently people ate cereal the lower the fat content of the milk they chose to eat with that cereal. Why this should be true is not clear, but the relationship was very strong. Household income was negatively related to frequency of cereal consumption, and again it is not immediately evident why this should be so. Why females ate cereal more frequently than males can be speculated upon, but no clear rationale for this phenomenon is obvious. The relationship was weak, however, and probably doesn't warrant further consideration here.

Table 4: Relationships Between Frequency of Milk Use on Cereal and Other Selected Variables of Interest

Primary correlate (dependent variable): Frequency of milk use on cereal (1-7 times per week)

Secondary correlates (independent variables):

	Chi-square		Correlation	
	Value	Significance	Value	Significance
How hard do you try to eat foods high in fiber? (1=don't worry about it, 2=try somewhat hard, 3=try very hard)	36.6	0.0003	0.160	0.0000
How hard to you try to eat or drink foods high in calcium? (same scale as 1., above)	30.7	0.0022	0.115	0.0001
How often do you usually drink a glass of milk? (1=never to 6=every day)	77.4	0.0000	0.100	0.0004
When you have a glass of milk, what type do you usually drink? (skim=1, low-fat=2, regular (whole)=3)	40.5	0.0001	-0.142	0.0000
Household income (seven intervals from less than \$10,000 to \$60,000 or more)	52.1	0.0401	-0.045	0.0879
Sex of respondent (female=1, male=2)	9.6	0.1432	-0.037	0.1066
Age of respondent (a continuous variable)	----	-----	0.181	0.0000
Years of formal schooling (a continuous variable)	----	-----	-0.012	0.684

Source: Penn State survey of 1,402 U.S. adults.

Age of respondent was highly positively related to frequency of cereal consumption. Remember, however, that only persons 18 years or older were interviewed, and we have no information on frequency of cereal consumption by persons under 18. Finally, years of formal schooling seemed to have virtually no effect on frequency of cereal consumption. Thus, it can be disregarded as a variable which might explain differences in cereal consumption in the United States.

IMPLICATIONS

The increased consumption of ready-to-eat cereals has had a very important positive effect on the consumption of fluid milk in the United States. Cereal consumption is increasing at an increasing rate, but the change is particularly remarkable in the last five years. Total fluid milk consumption (skim, low-fat, and whole) was down 19.0 percent during the entire period 1967-87, but only 1.6 percent (3.7 pounds per person) during the five year period 1982-87. In fact, there was a small increase in 1985 over 1984. Ready-to-eat cereal consumption (and hence the milk assumed to be consumed with such cereal) was up 36.6 percent 1967-87, and 16.0 percent 1982-87. This change during 1982-87 implied an increase in cereal-milk consumption of 6.8 pounds per person, almost twice the decline in total fluid consumption (3.7 pounds) during the same five year period. Meanwhile, estimated per-capita consumption of fluid milk for non-cereal uses declined 5.7 percent, or 10.5 pounds. Furthermore, non-cereal fluid milk consumption never increased year-to-year during the 1982-87 period, and in fact increased only once (1970-71) in the twenty year period 1967-87.

The obvious question is: Do efforts to increase milk consumption (or, to reduce the rate of decrease), when successful, increase the consumption of ready-to-eat cereals, or do forces other than increased milk consumption account for the increase in cereal consumption? It is conceivable that increased cereal consumption might be used as the vehicle for carrying out a decision to consume more milk. It seems considerably more likely, however, that the connection runs in the other direction; that is, increased cereal consumption causes milk consumption to increase. Since we have no evidence from our research to substantiate such a hypothesis, it is left to the reader's intuitive judgment as to its probable validity.

In any case, it seems almost certain that cereal and milk consumption go hand-in-hand. The dairy industry benefits when more cereal is sold, for whatever reason. These reasons might be because of changes in eating habits and preferences (the desire for more dietary fiber, or the convenience of ready-to-eat cereals in households where both spouses work, for example), because of the virtual explosion in varieties, types, forms, and flavors of cereals, or because of the huge sums of money spent by cereal manufacturers to advertise and promote their products. There may be some merit in having the dairy industry help the cereal companies sell cereal. In fact, one supermarket chain recently printed cereal coupons on the sides of fluid milk cartons. At any rate, the important and growing contribution of increased consumption of cereal to increased consumption of milk should be recognized.

SUMMARY

Three sources of data were analyzed to generate an estimate of the relationship between the consumption of fluid milk and ready-to-eat breakfast cereals. The first was a non-random survey to establish the average size of a serving of ready-to-eat cereal (1.55 ounces) and the average quantity of milk (6.70 ounces) by weight used with each serving of cereal. The second data source was a national survey of 1,402 U.S. adults to establish how often (2.23 times per week) ready-to-eat cereal was eaten by the typical consumer. The combination of the first two data sources provided the first estimate of cereal-milk consumption, 48.5 pounds per person per year in 1987. The third data source was the USDA publication Food Consumption, Prices, and Expenditures, 1966-87 in which annual per capita consumption of ready-to-eat breakfast cereals appeared (along with corresponding data for fluid milk products). A combination of data from the first and third sources resulted in the second estimate of cereal-milk consumption, 50.1 pounds per capita. An average of the two estimates, 49.3 pounds, was assumed for the subsequent analysis.

The 49.3 pounds estimated for 1987 was 22.1 percent of total fluid milk consumption that year. For 1967, cereal-milk consumption was estimated at 36.1 pounds per person, only 13.1 percent of total fluid milk consumption at that time. Thus, during the 20-year period 1967-87, cereal milk consumption went up 13.2 pounds, or 26.6 percent. Meanwhile, consumption of fluid milk for all other uses went from 239.9 pounds in 1967 to 174.2 pounds in 1987 a reduction of 65.7 pounds or 27.4 percent. Since the increase in cereal consumption was able to make up only 13.2 pounds (21.1 percent) of the decline

in non-cereal milk uses, total fluid milk consumption still declined by 52.5 pounds or 19.0 percent during the 20 year period.

In the national survey of U.S. adults conducted at Penn State in 1987 (the second source of data used in the present study) it was found that 17.4 percent of the respondents never used milk on cereal. About half of the people who never drank milk did use milk on cereal, however, leaving only 8.9 percent of the population that neither drank milk nor ever used it on cereal.

There was a close correlation between frequency of drinking milk and frequency of use of milk on cereal, as 72.3 percent of the interview respondents both drank milk and used it on cereal. There was also a highly significant positive relationship between frequency of milk use on cereal and the amount of effort respondents said they made to eat or drink foods that are high in calcium, and in fiber. The more frequently people used milk on cereal the more likely they were to drink skim and low fat milk rather than whole milk, and the more likely they were to be female rather than males. Household income was negatively related to frequency of cereal consumption, but the age of the respondent showed a positive correlation. Years of formal schooling seemed to have little to do with the frequency of cereal consumption.

All-in-all, increased consumption of ready-to-eat cereal has had a very important, positive effect on total fluid milk consumption in the United States. Cereal consumption generally increased at an increasing rate during the 20 year period 1967-87, but showed particularly strong gains during the five year period 1982-87. It is not certain whether efforts to increase the

consumption of milk, if successful, result in increased cereal consumption, or whether increased cereal consumption is caused by other forces which then automatically result in increased milk consumption. Logic suggests the latter is more likely the case. If this logic is sound, should dairy industry support of efforts to increase cereal consumption be considered?

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