

Evaluating the Effects of Nutrition Education

by

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The Dairy Council of California (DCC), funded by the dairy industry, provides materials for nutrition education to schools throughout California. These materials are used by teachers to educate students about topics such as the basic food groups, the recommendations for daily servings from each group on the USDA's Food Pyramid, and how to choose a balanced diet. An interesting question is whether nutrition education has any effect on students' food consumption patterns, and, if it does, whether the changes observed make investing in such educational materials profitable from an industry point of view.

In a recent study, we examined the effects of one component of the DCC's program, the *Exercise Your Options (EYO)* unit that is provided to middle schools in the State of California. We looked at the effects of this program on the consumption of all food groups, and then did a benefit-cost analysis to determine the profitability of the program to the dairy industry. Because the DCC is funded by assessments paid by

producers and processors in the dairy industry, our analysis focused on servings of dairy products, but we found that nutrition education had a positive effect on diets across several food groups. This article summarizes our results.

The Design of Our Experiment

Food records were completed by students in over one hundred California classrooms ranging from sixth through eighth grades. These classrooms were selected by DCC regional managers to cover a range of income levels, ethnic groups, and regions of the state, and to cover urban, rural and suburban areas. Thus, the students in our sample are representative of all of California.

Each food record consists of a diary completed by a student. They reported all foods consumed in the prior 24 hour period, along with portions. The records were completed with assistance by either the teacher or a DCC staff person, to help the students describe portion sizes accurately.

Figure 1. USDA Food Pyramid (Servings per Day)

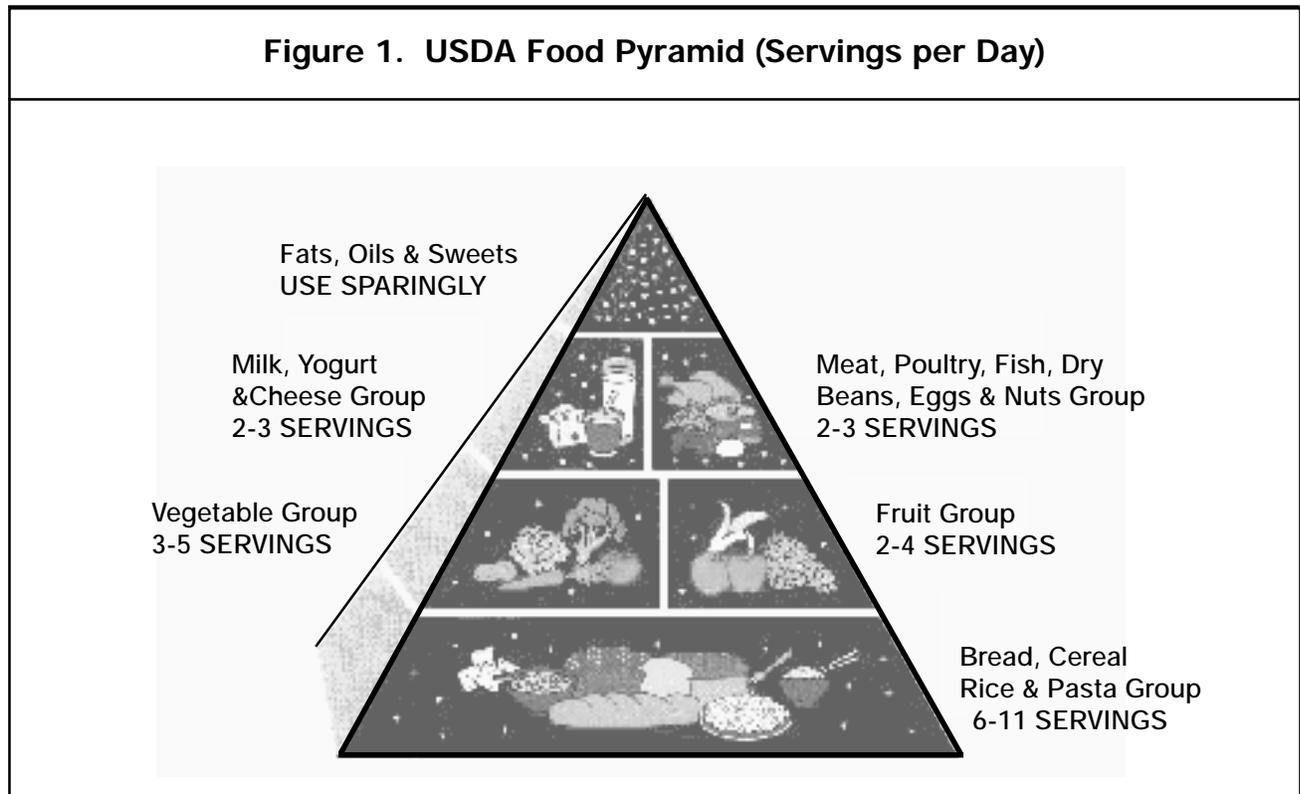


Table 1. Percentage Changes in Daily Servings of Food Groups

Food Group	-----EYO Group-----			-----Control Group-----		
	Record 1 to Record 2	Record 2 to Record 3	Record 1 to Record 3	Record 1 to Record 2	Record 2 to Record 3	Record 1 to Record 3
Dairy	18.36	-6.67	10.37	0.68	-1.15	-0.47
Meats	9.61	-2.59	6.77	3.60	7.14	10.84
Fruits	31.36	-22.86	0.78	16.16	-12.84	1.95
Vegetables	26.33	0.31	26.71	6.87	-1.55	5.22
Grains	4.59	0.34	4.94	-0.72	2.78	2.00
Extras	-6.16	2.04	-4.28	1.92	-6.61	-4.83
Sodas	-11.57	-2.69	-13.90	-12.39	-10.01	-21.04

Three sets of food records were completed in each classroom: one before the *EYO* program, one immediately after, and one approximately one month later. The difference between servings of each food group between records 1 and 2 provides a measure of the short-run effects of the program, and the difference between records 1 and 3 provides a longer-term measure of the program's effects. To ensure that we did not measure the effects of some other influence on the students' eating patterns, such as the change in season, some of the food records were obtained from classrooms that did not receive the *EYO* program. Any differences in behavior between the *EYO* classrooms and this control group could then reasonably be attributed solely to the *EYO* program itself.

Table 1 shows the results. Between record 1, before learning about nutrition, and record 2, just after learning about nutrition, the *EYO* group increased its average daily servings of dairy products by over 18 percent. Between records 2 and 3, there was a decrease in servings of dairy products of 6.67 percent, representing a net increase, between record 1 and record 3, of 10.37 percent. The control group, meanwhile, showed a slight increase in dairy servings between record 1 and record 2, and a slightly larger decrease between records 2 and 3, for a net decrease of roughly one-half of one percent over the record 1 to record 3 interval. Similar changes toward a healthier diet can be seen for the other food groups.

An estimate of the effects of the *EYO* program is the difference between these two groups' changes in eating patterns. For dairy servings, that difference is around 11 percent ($10.37 - (-0.47)$), which is roughly

one-fifth of a serving per day. This may seem like a relatively small increase, but the recommended number of servings of dairy products on the USDA's Food Pyramid is 2 to 3, and the mean number of servings from all record 1 diaries was 1.79, so the magnitude of the *EYO* effect is reasonably large, relative to the starting point.

Calculating the Profitability of the Program

Our longer paper contains a detailed description of the calculation of the benefits of the program to the dairy industry. The net benefit from the investment in nutrition education depends, first of all, on the duration of the *EYO* effect. If the program were to increase consumption of dairy products only during the time when the unit is covered in school, it would not be profitable. Based on our results from the third food record, the effect does appear to last for some time after the program. The longer it lasts, the more profitable the program.

It is also the case that the profitability of the program depends on *how* the increase in servings occurs. Because of the workings of the state milk marketing order, increasing fluid milk consumption is profitable for the industry. We did not conduct a separate analysis of the composition of the change in dairy servings, and instead calculated the benefits of the program for the full range of possible outcomes, from an extreme assumption that all of the increase was in the form of fluid milk, to the opposite extreme where none was fluid milk.

A final decision concerned how to estimate the change in consumption that occurred during the EYO unit itself. Because we did not observe consumption each day during the unit, only before and after, we had to make some assumptions about what happened in the interim. Table 2 shows the ratio of benefits to the dairy industry to the cost of the program for what we termed in our paper the intermediate case, in which we assumed that the short-run change began at the beginning of the EYO program. The rows of the table correspond to different assumptions about how much of the change in dairy servings was in the form of fluid milk, and the columns correspond to various assumptions about the persistence of the effect. Any combination leading to benefits greater than costs (a benefit-cost ratio greater than one) represents a profitable investment for the dairy industry.

Profitable combinations are shaded in table 2. If all of the increase in dairy servings turned out to be in the form of fluid milk, the program was profitable after only two months. To still be profitable, the effects have to last longer as the percentage in the form of fluid milk decreases.

Conclusion

In summary, the *Exercise Your Options* program did affect the eating patterns of the children who were taught the program. The profitability of the program for the dairy industry depends on the magnitude of the initial effect on consumption, the persistence of the effect, and the composition of the increase in consumption of dairy products. The EYO program clearly has had a number of other beneficial effects, both in terms of education and in terms of increased consumption of other healthy foods.

There are many public benefits of improved nutrition on the part of children, such as reductions in illness, improved school attendance and, perhaps, better ability to learn, and improved health later in life. These benefits are examples of public goods, whose value is difficult to quantify. Moreover, a characteristic of public goods is that there is no reason to expect them to be funded solely by private industry groups, even though those groups may value both the public goods and the goodwill they may bring. However, if nutrition education leads to an increase in the demand for a specific food, the producers or processors of that food may well find nutrition education to be a profitable investment.

This article is adapted from the recent article, "Doing Well by Doing a Body Good: An Evaluation of the Industry-Funded Nutrition Education Program Conducted by the Dairy Council of California," published by the authors in Agribusiness, Vol. 15(3): 371-392, 1999.

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Table 2. Private Benefit-Cost Ratios for EYO Program Under Various Assumptions

% increase in Fluid Milk	Months of EYO Effects Persistence											
	1	2	3	4	5	6	7	8	9	10	11	12
100	0.59	1.01	1.26	1.42	1.51	1.57	1.61	1.63	1.65	1.65	1.66	1.66
90	0.54	0.91	1.14	1.28	1.36	1.42	1.45	1.47	1.48	1.49	1.49	1.50
80	0.48	0.81	1.01	1.13	1.21	1.26	1.29	1.31	1.32	1.32	1.33	1.33
70	0.42	0.71	0.88	0.99	1.06	1.10	1.13	1.14	1.15	1.16	1.16	1.16
60	0.36	0.60	0.76	0.85	0.91	0.94	0.97	0.98	0.99	0.99	1.00	1.00
50	0.30	0.50	0.63	0.71	0.76	0.79	0.80	0.82	0.82	0.83	0.83	0.83