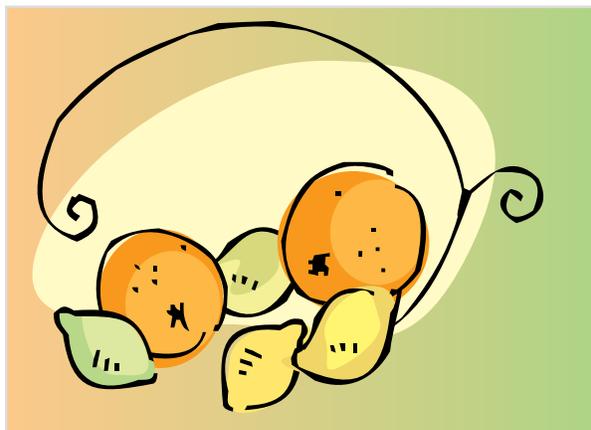


# Food Choices of Middle School Students: An Intervention Study

April, 2011

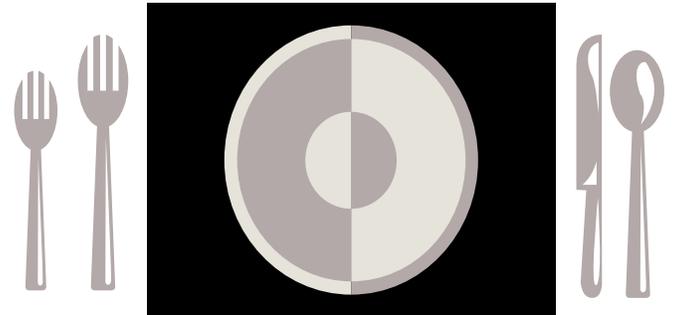
## Background

In a novel experiment, more than 2,000 students from six public middle schools in Spokane, Washington participated in an intervention program related to the school food environment. One low income and one higher income school were chosen as the treatment group, while the remaining four schools (two low income and two higher income) were selected as the control group. The objective of this research was to understand the connection between changes in school food environment and food choices of young adolescents.



## Study Design

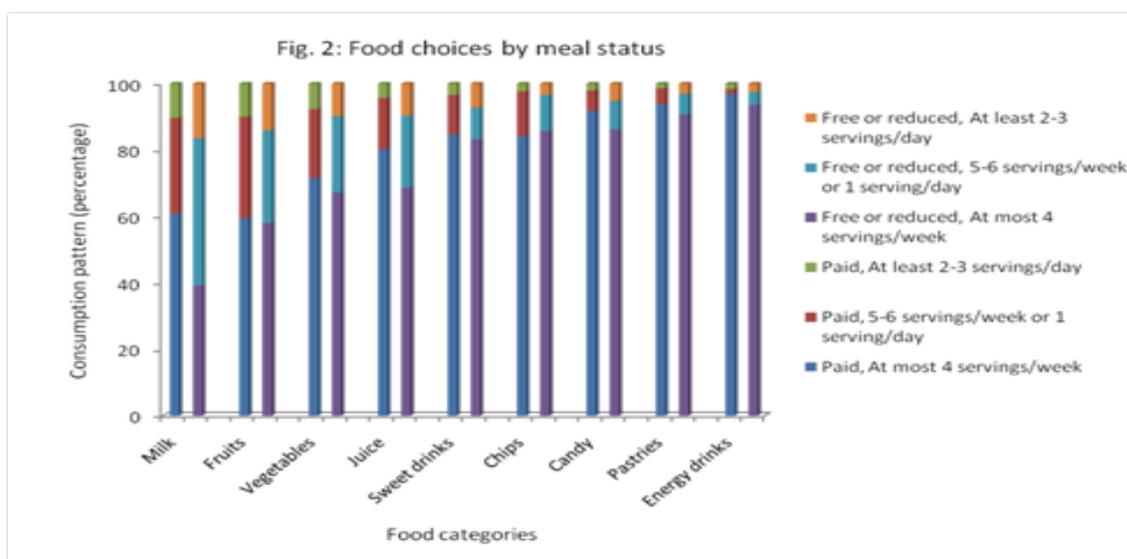
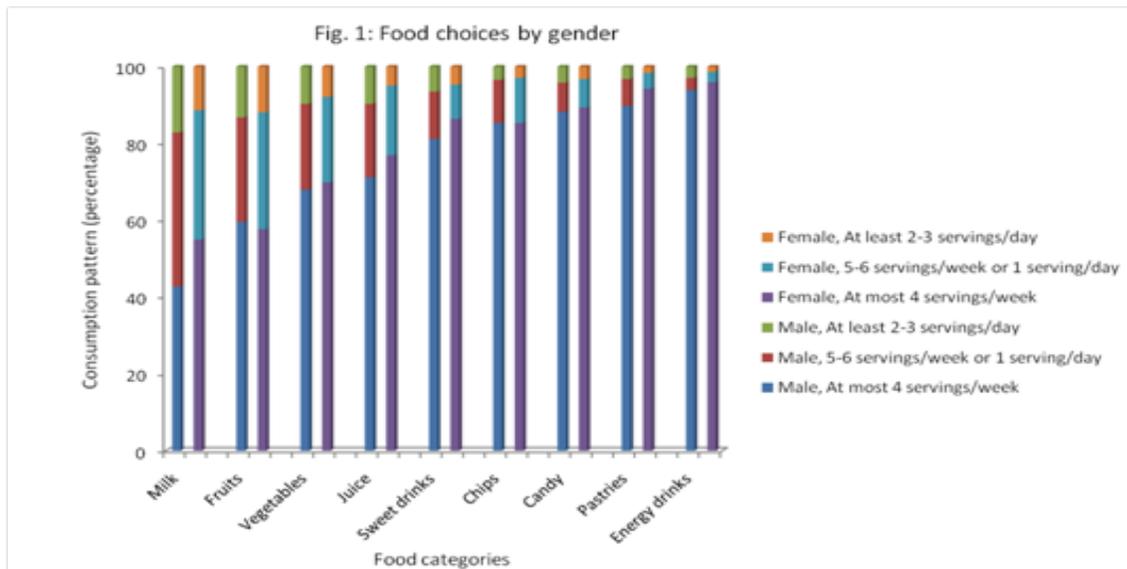
The intervention included modifying the school food environment by (1) removing juice products and allowing only non-flavored bottled water in vending machines, (2) restricting ala cart items to only milk and fruits, and (3) adding a seasonal fruit and vegetable bar accessible to all students. The control schools received no intervention beyond the district wellness policy requirements instituted three years prior to this study. The school district implemented a wellness policy that eliminated sugar beverages and only allowed 100% juice products and flavored non-caloric water in vending machines. Competitive ala carte items were limited to 250 calories and 9 grams fat. The modifications were initiated in the fall of 2007/2008 school year and were continued



## An Innovative Study

This intervention goes beyond other similar reported studies by reducing vending machine beverages to water only, limiting ala carte offerings, extending the changes in the school food environment to three years and assessing adolescent food consumption both in school and outside school.

through the 2008/2009 and 2009/2010 school years. A food behavior survey was administered to students in the 7th and 8th grades in both the intervention and control schools in 2009/2010 during the fitness and health class to assess the food behavior in school and outside school. The food behavior corresponded to students' food consumption pattern in nine food categories – juice, milk, sweet drinks, energy drinks, chips, candy, pastries, vegetables and fruits in a typical week. Approval for the project was granted by the school district Assessment Review Committee and the university Institutional Review Board. Combining information from all six public schools, Figures 1 and 2 show the consumption patterns in school across gender and meal status, respectively.



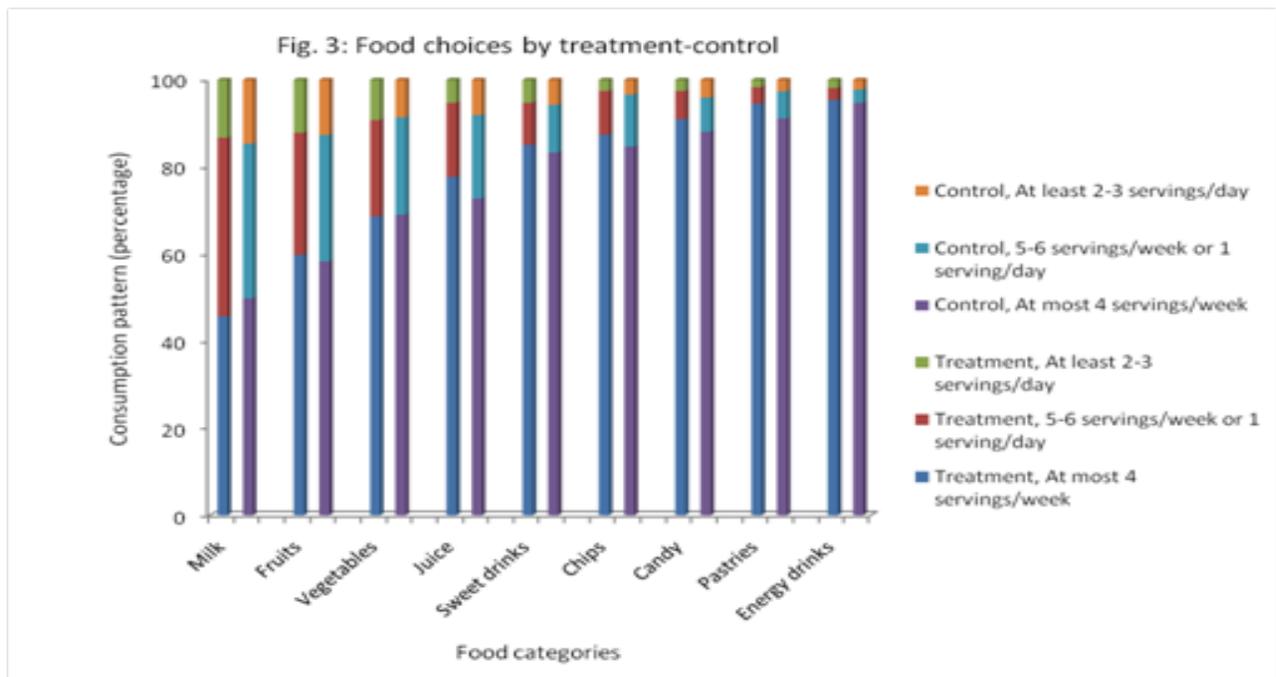
Students reported consuming higher frequencies of all food items included in this questionnaire outside of school than in school, with milk, fruits, and vegetables being most frequently consumed of the nine food items. However, differences were noted across male and female students (as shown in Figure 1) and also across meal status types (as shown in Figure 2), which was measured by observing whether the

student received free and reduced price meals or paid for meals. Male students reported significantly higher frequency of consumption of milk, juice, sweet drinks, pastries and energy drinks in school. Students who received free or reduced price meals reported significantly higher frequency of consumption of milk, vegetables, juice, candy, pastries and energy drinks in school.

## Summary of Findings

Statistical analyses were done to evaluate whether consumption patterns differed between intervention and control schools. Students in intervention schools were 56% less likely to consume pastries and 25% less likely to consume juice in school. Students at intervention schools were 24% more likely to consume milk outside school (not shown in Figure 3). It may

be because the limited beverage options at intervention schools created a taste preference for milk at home. In a case of good news and bad news, it was found that modifying the school food environment can have a positive impact on the food students consume. However, young adolescents, in general, had low consumption levels of fruits and vegetables.



Fruit and vegetable consumption reported by students at the intervention schools was not significantly better than those students in the control schools.

This study demonstrates that student behavior can be positively impacted by improving the food environment, and the food environment at school can have a positive impact on food behavior outside of school. A well-managed food and physical environment in school could be a part of the long term solution to the obesity problem, but the cost of removing vending machines and low-cost high-energy fast food from schools is significant. In this study, the intervention schools suffered significant setbacks in their revenue generating capability. The

two intervention schools experienced an annual loss of approximately \$24,000 in gross school meal sales due to lost ala carte sales, and a \$9,000 annual loss in vending sales. However, an important economic incentive to reduce the prevalence of obesity is that it not only affects individuals with higher weight, who may experience higher personal expenses and lower wages due to reduced work productivity, but it raises health care costs for the entire society. Thus, policies related to foods provided in school are an important strategy to provide models of healthy eating patterns and must continue to be a priority.

The source of this report is an article that is currently under review in the Journal of American Dietetic Association. The authors of the study are Doug Wordell, Kenn Daratha, Bidisha Mandal, Ruth Bindler, Sue Butkus, and Lisa Ochs.

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