



The costs and calorie content of à la carte food items purchased by students during school lunch

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ABSTRACT

School environments influence student food choices. À la carte foods and beverages are often low nutrient and energy dense. This study assessed how much money students spent for these foods, and the total kilocalories purchased per student during the 2012–2013 school year. Six elementary and four intermediate schools in the Houston area provided daily food purchase transaction data, and the cost and the calories for each item. Chi-square analysis assessed differences in the number of students purchasing à la carte items by grade level and school free/reduced-price meal (FRP) eligibility. Analysis of covariance assessed grade level differences in cost and calories of weekly purchases, controlling for FRP eligibility. Intermediate grade students spent significantly more on à la carte food purchases and purchased more calories (both $p < 0.001$) than elementary school students. Lower socioeconomic status (SES) elementary and intermediate school students purchased fewer à la carte foods compared to those in higher SES schools ($p < 0.001$). Intermediate school students purchased more à la carte foods and calories from à la carte foods than elementary students. Whether the new competitive food rules in schools improve student food selection and purchase, and dietary intake habits across all grade levels remains unknown.

1. Introduction

The school food environment influences the dietary habits of children and adolescents. The National School Lunch Program (NSLP) foods account for only a portion of the foods available to students at school. À la carte foods and beverages are sold in snack bars or vending machines and compete with the NSLP meal. They are often called competitive foods.

Previous studies have found that students with access to à la carte foods consumed more low nutrient, energy dense foods like sugar sweetened beverages, French fries, and fewer fruits and vegetables (Cullen et al., 2000). Students with access to à la carte foods also consumed fewer healthy foods compared to the previous year when the same students did not have access to à la carte foods (Cullen and Zakeri, 2004). On an average school day in 2004–2005, approximately 40% of school aged children purchased and consumed at least one à la carte food (Fox et al., 2009). Among students who consumed à la carte foods, those in elementary school consumed 216 cal; middle and high school students consumed 273 and 336 cal, respectively (Fox et al., 2009). Sixth grade students in Kentucky consumed 234 cal from à la carte

foods (Templeton et al., 2005). Energy intakes from such high calorie foods may lead to poor energy balance and obesity risk.

The Healthy Hunger-Free Kids Act of 2010 gave the U.S. Department of Agriculture (USDA) the authority to set standards for all foods sold in schools (Food and Nutrition Service - U.S. Department of Agriculture, 2017). New standards for à la carte foods were to be implemented in the fall of 2014. Foods meeting these standards are called “Smart Snacks” and must be fruits, vegetables, whole-grain rich, dairy, or a protein food, or contain 10% of the daily value of calcium, potassium, vitamin D, or fiber (Food and Nutrition Service - U.S. Department of Agriculture, 2017). Limits were also placed on calories, total and saturated fats, trans fat, sugar, and sodium in competitive foods. Improved school food policies providing more healthful food options like fruit and vegetables, and limiting the availability of low-nutrient, energy-dense food products may positively impact children's dietary habits and prevent obesity.

Legislation to limit or eliminate the sale of à la carte foods has been met with concern from School Food Authorities because of the potential for lost revenue from à la carte foods food sales may make it more difficult to support the cost of federal school meals programs (Peterson,

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2011). Although schools receive federal reimbursement for meals served in the schools that meet guidelines, food service directors have reported using à la carte food revenue to cover the operational costs of their meal programs, such as utilities, cleaning supplies, and waste disposal (Nollen et al., 2011). In 2002–03, school districts reported obtaining about 12% of revenue from competitive foods (Guthrie et al., 2013). Using national data from 2005, the average annual revenue from competitive foods was estimated at \$16 per elementary school student, \$82 per middle school student, and \$64 per high school student (Guthrie et al., 2013). School level revenues may also vary by the percentages of students eligible for FRP meals (Guthrie et al., 2013).

The objectives of this paper are to identify the types of à la carte foods purchased by elementary and intermediate school students, the average amount of money spent by students to purchase these foods, and the calories provided by these foods prior to the implementation of the new Smart Snacks rules in 2014. School level eligibility for FRP meals was used as a covariate.

2. Methods

2.1. Setting

One school district in the Houston area provided à la carte sales data for 10 schools for the 2012–2013 school year. All lunch transactions for each student in the cafeteria were entered into Point-of-Service (POS) software by the cashiers. The Child Nutrition Director selected the schools based on eligibility for FRP, which ranged from 10 to 79% in the district. Details on school selection have been previously published (Cullen et al., 2015). Three elementary schools with 49–79% of students eligible for FRP and two intermediate schools with about 34% of students eligible for FRP were considered to be lower socioeconomic status. There was an average of 734 kindergarten through grade 5 students enrolled in the six elementary schools: 6.6% African American, 37.6% Hispanic/Latino, 49.3% White, and 6.6% other. The four intermediate schools enrolled an average of 912 students in grades 6–8: 10.9% African American, 28.8% Hispanic/Latino, 45.8% White, and 14.5% other. The study was approved by the Institutional Review Board at Baylor College of Medicine (H-28086). Because the data did not include student identifying information, consent forms were not required.

2.2. Data

The district POS software provides the following daily information: transaction date and identification (ID) number, whether it was a reimbursable lunch meal, the name of each of the individual components selected (fruit #1, fruit #2, entrée, milk, vegetable), and purchased à la carte items (chips, cookies). The school district data manager retrieved the daily transaction data for each school for the 2012–2013 school year, saved each as a text file, and prepared it for the researchers. A separate excel file was created with the calories and cost for every à la carte item available in the schools. This information was obtained from the district's Child Nutrition Department. The school text files were merged with the calorie and cost information of each food item.

A separate spreadsheet was created with the calories and cost for every à la carte item available in the schools from information provided by the district. The school text files were merged with the calorie and cost information of each food item.

2.3. Statistical analyses

The resulting data file was aggregated by transaction ID, school, and date; the calorie and cost for each transaction was summed. The aggregated data file had one transaction per transaction ID and included the amount of money spent for à la carte items, the calories provided by those items, grade level (elementary, intermediate), and whether it was low income school, based on percent of students eligible for FRP meals.

The frequency of à la carte food items purchased was calculated. Differences in the number of students purchasing à la carte items by grade level and school FRP by grade level were assessed with chi-square analysis. Analysis of covariance (ANCOVA) assessed differences in the average weekly cost and calories of à la carte foods purchased by grade level (elementary or intermediate), with FRP status as a covariate. One ANCOVA included all transaction data and one only included the transactions for those students who purchased an à la carte food. The level of significance was set as $p < 0.05$. All the analyses were performed using SAS (version 9.3, 2011, SAS Institute Inc.).

3. Results

The elementary school students purchased a total of 221,343 à la carte food and beverage items over the school year. Nine items were available and included baked chips, crackers, pretzels, yogurt, rice crispy treats, fresh fruit, and pickles as well as bottled water, and plain or flavored milk. The most popular à la carte foods purchased were baked chips at 34.5% of all purchases, followed by rice crispy treats (15.7%), bottled water (7.3%), Goldfish Crackers (6.5%), yogurt cup (4%), and pretzels (3.5%).

The intermediate school students had over forty à la carte food and beverage options available to them, including mozzarella sticks, pizza, burgers, corn dogs, baked chips, frozen desserts, baked goods, sports drinks, and slushies. They made a total of 728,584 purchases: the top items were baked chips (17.5%), sports drinks (13.4%), chocolate chip cookies (13.3%), pizza slice (9.2%), slushies (4.9%), and tea (3.5%).

Significantly more intermediate school students purchased à la carte foods and beverages than elementary school students ($p < 0.001$) (Table 1). Significant differences were also found in à la carte purchases by school FRP status within grade level ($p < 0.001$). Fewer elementary and intermediate students in schools with high FRP eligibility (more low income students) purchased à la carte foods compared with elementary and intermediate school students in low FRP eligibility schools (higher income schools) ($p < 0.001$) (Table 1).

Elementary school students spent significantly less money each week on à la carte food items compared with intermediate school students ($p < 0.001$) (Table 2). The à la carte food items purchased by intermediate school students provided significantly more calories on a weekly basis than those purchased by elementary school students ($p < 0.001$).

When only including those transactions for students who purchased an à la carte food item, similar results were found, but the amounts of money spent and calories purchased were higher (Table 2). Elementary

Table 1
Frequency of à la carte purchase transactions by grade level, school income status based on school FRP^a eligibility, and FRP eligibility by grade level for 6 elementary and 4 intermediate schools in the Houston TX area during the 2012–2013 school year.

	No à la carte purchase		À la carte purchase		x ²	p-Value
	N	%	N	%		
Grade level						
Elementary	269,267	69.9	153,219	28.5	154,755	< 0.0001
Intermediate	116,210	30.2	38,4541	71.5		
Elementary school						
Low income ^a	181,998	67.6	51,535	33.6	45,542.95	< 0.0001
Not low income	87,269	32.4	101,684	66.4		
Intermediate school						
Low income ^a	62,936	54.2	134,864	35.1	13,602.72	< 0.0001
Not low income	53,274	45.8	249,677	64.9		

^a Free or reduced price meal eligibility.

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