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Exploring Milk and Yogurt Selection in an Urban Universal School Breakfast Program

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ABSTRACT

Purpose/Objectives

The purpose of this study was to explore milk and yogurt selection among students participating in a School Breakfast Program.

Methods

Researchers observed breakfast selection of milk, juice and yogurt in six elementary and four secondary schools. Data were analyzed using descriptive statistics and logistic regression to predict factors influencing yogurt selection.

Results

Secondary school females were more likely to choose yogurt than males (OR = 1.931, p = 0.0033). Elementary students who chose no milk were more likely to choose yogurt than students who chose either white milk (OR = 3.592, p = < .0001) or chocolate milk (OR = 2.273, p = 0.0005). Secondary students who chose no milk were more likely to choose yogurt than students who chose white milk (OR = 3.494, p = 0.0060).

Application to Child Nutrition Professionals

Yogurt on the school breakfast menu appears to offer an opportunity for non-milk drinkers and secondary school females to access dairy foods.

Keywords: school breakfast; yogurt; milk; selection; influences

INTRODUCTION

Research has indicated that eating breakfast greatly contributes to improved academic performance, school attendance, and overall nutrient intake of children (Murphy et al., 1998; Murphy, 2007; Pollitt, 1995). Additionally, given that food preferences and eating behaviors are established early in life and are influenced by both the physical and social environment, it is important to address healthful eating practices and food selection at a young age (Patrick & Niklas, 2005). Schools provide an optimal environment for children to access important nutrients and learn about healthful food selection and eating practices through the federally funded school meal programs. Specifically, the School Breakfast Program (SBP) is an important strategy to improve the nutrition of elementary and secondary school children as well as an important factor in developing lifelong healthful eating habits (Bergman & Gordon, 2010; Stang & Bayerl, 2010); yet a decline in breakfast consumption has been reported with increasing age beginning in middle school throughout adolescence (Alexy, Wicher, & Kresting, 2010; Siega-Riz, Popkin, & Carson, 1998).

Schools and the U.S. Department of Agriculture (USDA) are actively seeking new ideas and strategies to increase breakfast participation. Two strategies include Universal Free Breakfast and alternative meal service approaches (USDA, 2012). Universal Free Breakfast aims to reduce the stigma of school breakfast participation and alternative meal service approaches, such as breakfast in the classroom, grab and go, and breakfast vending machines, and allows easy access to breakfast to overcome barriers such as time and lack of hunger (USDA, 2012). It is interesting to note that another important meal strategy includes the family-style meal service that is used in some Head Start programs, preschools, and childcare facilities as a way to provide mealtime learning opportunities, such as adult role modeling of healthy food/eating behaviors, student self selections, and repeated exposure and encouragement of new foods, such as yogurt (Birch, 1999; Mogharreban & Nahikian-Nelms, 1996). This style of meal service has been shown to influence healthy food preferences and eating practices and may provide future opportunities and strategies for school food service as more Head Start/preschool programs are housed within the public school systems.

According to the 2010 Dietary Guidelines (U.S. Department of Health and Human Services [USDHHS] & USDA, 2010), children's diets are low in milk and present a challenge in receiving adequate nutrients including calcium, potassium, and vitamin D. Dairy products are an important source of these nutrients and, as such, are offered to children who participate in the school meal programs in the form of fluid milk, including flavored milk, although those crucial nutrients can also be found in other types of dairy products such as yogurt and cheese. Unfortunately, there has also been a decrease in the rate of milk consumption with increasing age of school children (Rizzoli, 2014). The Healthy, Hunger-Free Kids Act of 2010 requires schools to offer a variety of fluid milk consistent with the Dietary Guidelines recommendations: fat- free flavored milk and fat- free or 1% unflavored milk in the SBP (USDA, 2012). However, offering flavored milk in school meals has not been without controversy, particularly in light of childhood obesity rates, so many school districts are eliminating flavored milk under the assumption it is the students' first choice. Condon, Crepinsek, and Fox (2009) found that SBP participants were more likely to consume flavored milk than nonparticipants, although a majority of all children participating in the SBP chose unflavored milk. However, the availability of flavored milk appears to be an opportunity for adolescents, in particular, to receive the important nutrients from dairy that promote bone growth and deposition (Rizzoli, 2014).

In addition to fluid milk, yogurt provides a source of protein and dairy-related nutrients and has been recently included in the SBP as a meat alternative. Research related to the selection of yogurt in the SBP and its impact on the selection of fluid milk has not been reported in the literature previously; therefore, the purpose of the study was to explore 1) milk and yogurt selection in the SBP following the addition of a 4-ounce serving of yogurt on the school breakfast menu and 2) the influences of gender, school type (elementary or secondary), and type of breakfast meal service on yogurt selection.

METHODOLOGY

Setting

The Cincinnati Public School District (CPS) is the third largest in the state of Ohio with approximately 33,000 students (preschool through 12th grade). The school district had 39 elementary schools and 14 secondary schools during the 2012-2013 school year. The school district is ethnically diverse with 70% African-American students, 24% Caucasian, 5% multiracial, 2.6%

Hispanic, 0.8% Asian, and 0.1% American Indian . Seventy-three percent of students were eligible for the federal *Free or Reduced-Price Lunch Program* in the 2012-2013 school year and the school district offers a Universal Breakfast Program, which makes breakfast free to all students in the district. In the 2011-2012 school year, the CPS Food Service included a four-ounce serving of Upstate Farms yogurt (variety of flavors) as a new entree at breakfast and collaborated with a research team to conduct the study. A research protocol was approved by the school district's Office of Research, Evaluation and Testing.

Study Design and Sampling Description

This study utilized direct observations of student selections of milk, juice, and yogurt during the school breakfast meal service in randomly selected schools throughout the district. Based on the recommendation of Harrel, Lee, Matchar, and Reichert (1985), the researchers determined that a sampling of 10 schools would yield a sufficient sample size (n=1800) of student observations. Stratified random sampling with proportional allocation was the method used for the sampling in which four strata were formed by type of school (elementary or secondary) and by socioeconomic status [SES] (high and low based on the percent of student eligible for free and reduced meals within each school building). The number of schools that were randomly chosen from each stratum was proportional to the total student enrollment in the schools in that stratum. Using SAS software package, version 9.3 (SAS Institute, Cary, NC), a random sample of ten schools was drawn from the district. The final sample included six elementary school (three from each SES) and four secondary schools (two from each SES).

Data Collection/Observation Procedures

An observation checklist was designed which contained dichotomous items including gender, type of milk (white, chocolate, none), selection of juice, and selection of yogurt. Direct observations of breakfast selections were conducted on one Wednesday in each of the randomly selected schools during the breakfast meal service. Wednesdays in January and February 2013 were chosen because yogurt was offered as an entree on the district breakfast menu and these months did not interfere with district testing or holidays. A site visit was conducted with each school to determine the ideal locations for the observations. Observers were positioned at the end of the cafeteria line and near grab and go locations. Students' gender and milk, yogurt and juice selections were noted on the observation checklist form.

Inter-rater Reliability

Because four observers were used in this study, inter-rater reliability (IRR) was important for overall validity. Guidelines for interpreting IRR were used (Landis & Koch, 1977), with categories of substantial agreement (0.61 to 0.80) and almost perfect agreement (0.81 to 1.00). The acceptable level of agreement was set at 0.90. The four observers were trained and the IRR process was conducted during one of the site visits. Four researchers observed breakfast selections of the same 30 students. Comparison of the four observers' checklists showed a 100% agreement, which exceeded the acceptable threshold of 0.90.

Data Analyses

Microsoft Excel for Mac 2011 Version 14.3.4 and Apple Numbers '09 Version 2.3 were used to build the database. Descriptive statistics were summarized and chi square analysis conducted using SPSS Version 22 (2013). Comparisons including all students in both elementary and secondary schools were done using the Cochran-Mantel-Haenszel chi-square test adjusting for

student gender. Logistic regression of the observation data was conducted using SAS software package, version 9.3 (SAS Institute, Cary, NC, USA). A level of significance $\alpha = 0.05$ was used for all statistical tests. The selection of milk and juice, gender, meal service, and percent of students eligible for free/reduced meal in the building were used as independent variables/covariates to predict the selection of yogurt. Separate analyses were conducted by type of school.

RESULTS AND DISCUSSION

Characteristics of Study Participants

A total of 1,876 students from the six elementary schools and 972 students from the four secondary schools participated in this study (Table 1). The percentage of students who were eligible for free/reduced meals was 88.9% in the elementary schools ranging from 47.5% to 98.9% and 61.4% in the secondary schools ranging from 20.4% to 81.6%. The male to female ratio in elementary school breakfast participants was close to 1:1 with 50.7% males and 49.3% females.

However, the male to female ratio in secondary school participants was 1:0.72 with 58.0% males and 42.0% females (Chi-Square [χ^2] = 13.624, p <0.0001). The male to female ratio in this study was similar to previous relevant studies. A study exploring fourth-grade student participation in breakfast reported that there was no difference in gender in participation in the SBP (Guinn, Baxter, Thompson, Frye, & Kopec, 2002), whereas more boys participated in school breakfast than girls in a secondary school study (USDA, 2007).

Table 1. ***Elementary and Secondary Student Study Participants as a Percentage of Enrollment in the Cincinnati Public School District Academic Year 2012-2013)***

	Elementary (N=19,847)		**Secondary** (N=12,721)	
	n	%	n	%
Total Study Participants	1,876	9.5	972	7.6
Males	952	4.8	564	4.4
Females	924	4.7	408	3.2

Yogurt, Milk and Juice Selection in Elementary and Secondary Schools

There were no significant differences in yogurt selection between elementary (10.5%) and secondary schools (10.0%; χ^2 (1) = 0.10, p =0.755). However, a significantly higher percentage of male students selected yogurt in elementary schools (10.6%) than secondary (7.3%) schools (χ^2 = 4.65, p =0.018), whereas a significantly higher percentage of female students selected yogurt in secondary schools (13.7%) than elementary schools (10.4%; χ^2 = 3.12, p=0.049). Previous studies related to yogurt selection in the SBP have not been identified.

Significantly more elementary students (78.0%) selected either white or chocolate milk than secondary students (52.1%) (χ^2 (1) = 206.61, p =0.000; Table 2). Additionally, of the students who selected milk (n=1,464), significantly more elementary students chose white milk (n=885,

60.2%) over chocolate milk (n=583, 39.82%). However, of the secondary students who selected milk (n=506), more students chose chocolate milk (n=343, 67.7%) over white milk (n=163, 32.2%) (χ^2 (1)= 107.45, p <0.0001, Table 2). Similar patterns of milk selection were found in male and female participants between elementary and secondary schools (Table 2).

Table 2. ***Comparisons of Milk, Yogurt, and Juice Selections between Elementary and Secondary Male and Female Study Participants (N=2,848)***

		Elementary (N=1,876)		**Secondary** (N=972)			
Gender	Type of Beverage	n	%**	n	%**	χ^2	p
Both*	Yogurt	197	10.5	97	10.0	0.10	0.755
	All types of milk	1,464	78.0	506	52.1	206.61	<0.0001
	White milk	885	47.2	163	16.8	107.45	<0.0001
	Chocolate milk	583	31.1	343	35.3		
	Juice	1,581	84.3	919	94.5	64.89	<0.0001
	Total	1,876	100	972	100		
Male	Yogurt	101	10.6	41	7.3	4.65	0.018
	All types of milk	739	77.6	326	57.8	66.60	<0.0001
	White milk	413	43.4	94	16.7	126.95	<0.0001
	Chocolate milk	326	34.2	232	41.1		
	Juice	783	82.2	534	94.7	48.01	<0.0001
	Total	952	100	564	100		
Female	Yogurt	96	10.4	56	13.7	3.12	0.049
	All types of milk	725	78.4	180	44.1	153.29	<0.0001
	White milk	468	50.6	69	16.9	184.09	<0.0001
	Chocolate milk	257	27.8	111	27.2		
	Juice	798	86.4	385	94.4	18.23	<0.0001
	Total	924	100	408	100		

* Cochran-Mantel-Haenszel chi-square test was used when comparisons included all students in both elementary and secondary school to control for gender, and Chi-square test was used when comparisons included only male or female students.

** Percentages do not add up to 100% because yogurt was offered as meat/meat alternative, white milk and chocolate milk as milk, and juice as fruit alternative.

Significantly fewer secondary male students (16.7%) chose white milk than elementary male students (43.4%), and conversely significantly more secondary male students (41.1%) chose chocolate milk than elementary male students (34.2%) (χ^2 = 126.945, p <0.0001). The proportion of elementary and secondary students selecting chocolate milk in this study was higher than that reported in a previous study of school meals by Condon et al. (2009) where 23% of elementary, 24% of middle, and 18% of high school students consumed flavored milk. This difference may be due to the "consumption" versus the "selection" of milk, where milk that is selected may not always be consumed. A similar percentage of elementary (27.8%) and secondary (27.2%) female

students chose chocolate milk, but fewer secondary female students (16.9%) than elementary female students (50.6%) chose white milk ($\chi^2 = 184.092$, $p < 0.0001$). Although this study only explored milk selection, the results are consistent with previous dairy consumption research indicating that more young children and adolescent boys consume milk than girls (Kit, Carroll, & Ogden, 2011) and that there is a decreasing trend in milk consumption from childhood through adolescence, particularly in secondary school females (Edwards & Magel, 2007). Additionally, although more students selected chocolate milk in this study than previous research (Condon et al., 2009), more elementary students selected white versus chocolate milk, challenging the perception that children will always select flavored milk when offered.

In light of the decreasing trend of milk consumption with increasing age, the availability of flavored milk appears to be an opportunity for adolescents in particular to receive the important nutrients from dairy foods that promote bone growth and deposition (Rizzoli, 2014). Offering flavored milk in schools has been at the center of controversy mainly due to increases in childhood obesity. Also many school districts are making decisions to eliminate flavored milk under the assumption that this is the first choice for students. However, previous research has indicated that the consumption of flavored milk has a positive effect on nutrient intake without adverse effects on weight (Frary, Johnson, & Wang, 2004; Murphy, Douglass, Johnson, & Spence, 2008). According to Hanks, Just, and Wansink (2013), eliminating flavored milk from school meals was linked to an 8.2 % decline in the proportion of students who selected milk.

Significantly more secondary students (94.5%) than elementary students (84.3%) selected juice for breakfast (χ^2 (1) = 64.89, $p = 0.000$; Table 2). Similar differences in juice selection between elementary and secondary schools were found in both male ($\chi^2 = 48.01$, $p < 0.0001$) and female participants ($\chi^2 = 18.23$, $p < 0.0001$). However, elementary and secondary students selected a higher percentage of juice in this study than previously reported in the SBP literature. Condon, Crepinsek, and Fox (2009) reported that 59% of secondary students and 57% of elementary students consumed juice at breakfast.

Influences on Yogurt Selection for Elementary Students

There was no significant difference between elementary females and males in the selection of yogurt (OR = 0.997, $p = 0.9838$, Table 3). Students who chose *no milk* were more likely to choose yogurt than the students who chose *any types of milk*. For those who chose *no milk*, the odds of choosing yogurt were close to 3.6 times higher than for those who chose *white milk* (OR = 3.592, $p < 0.0001$) and almost 2.3 times higher than for those who chose *chocolate milk* (OR = 2.273, $p = 0.0005$). There was no difference in the odds of choosing yogurt between those who chose *chocolate milk* and *white milk* (OR = 1.581, $p = 0.0577$). Based on these study results, yogurt at breakfast appears to be a positive alternative, particularly for students who do not select milk at breakfast in the elementary school. These results also seem to indicate that fluid milk selection was not impacted or replaced by yogurt selection in the breakfast program.

The odds of choosing yogurt for those in *preschool family style* were nearly 12 times higher than who went through the *cafeteria line* (OR = 11.929, $p < 0.0001$) and almost 7 times higher than for those who were served in their *classroom* (OR = 6.757, $p < 0.0001$; Table 3). There was no difference between *classroom* service and *cafeteria* line service as a predictor of yogurt selection (OR = 1.763, $p = 0.1264$).

Table 3. ***Logistic Regression Models of Gender, Types of Milk and Juice Selections, Types of Meal Service, Free-reduced Meal Eligibility, and Total Enrollment on Yogurt Selection as an Entree by Elementary School Students (N=197)***

Variables		*p*	Chi-square[3]	OR[1]	95% CI[2] OR
Gender					
Males (n=101, 10.6%[*]) Females (n=96, 10.4%)	Males vs. Females	0.9838	0.0004	0.997	0.725-1.370
Selection of Milk					
No Milk (n=73, 17.7%)	No milk vs. White milk	<0.0001	38.3836	3.592	2.397-5.384
White Milk (n=81, 9.2%)	White vs. Chocolate milk	0.0577	3.6026	1.581	0.985-2.536
Chocolate Milk (n=43, 7.4%)	No milk vs. Chocolate milk	0.0005	12.0391	2.273	1.429-3.614
Selection of Juice					
Yes (n=165, 10.4%) No (n=32, 10.9%)	No vs. Yes	0.0264	4.9276	1.697	1.064-2.708
Types of Meal Service					
Classroom (n=10, 10.9%)	Family style vs. Classroom	<0.0001	24.0515	6.757	3.156-14.493
Family Style (n=70, 41.7%)	Family style vs. Cafeteria	<0.0001	125.0752	11.929	7.725-18.419
Cafeteria (n=117, 7.2%)	Classroom vs. Cafeteria	0.1264	2.3357	1.763	0.852-3.647
Free/Reduced Meal Eligibility (%) 88.9 ± 13.1 (47.5-97.9)[4]		0.2701	1.2161	1.008	0.994-1.023
Total Enrollment (n) 569.6±104.0 (441-700)[4]		0.3360	0.9257	0.999	0.998-1.001

Max- Rescaled $R^2 = 0.1794$; Likelihood Ratio: $p < 0.0001$; Degree of Freedom= 8

[1]OR=Odd Ratio; [2]CI OR=Confidence Interval; [3]Wald Chi-Square; [4]*M* ± *SD* (Minimum-Maximum)

[*]Percentage = number of students selected yogurt / total number of students

Influences on Yogurt Selection for Secondary Students

Female students in secondary schools were 1.9 times more likely to choose yogurt than male students (OR = 1.931, $p = 0.0033$; Table 4). Frary et al. (2004) found that consumption of dairy foods, which included flavored yogurt, had a positive impact on overall quality of the diet. Smith, Kolars, Savaiano, and Levitt (1985) also reported that yogurt is an optimal substitute for milk in terms of calcium absorption and may be ideal for individuals who avoid milk either due to lactose intolerance or other reason. For female students, yogurt may offer an opportunity to

get the nutrients that dairy products provide through the selection of yogurt. Secondary students who chose *no milk* were nearly 3.5 times more likely to choose yogurt than students who chose *white milk* (OR = 3.494, $p = 0.0060$). Unlike the results for the elementary schools, there was no difference between secondary students who chose *no milk* and those who chose *chocolate milk* in their likelihood of choosing yogurt (OR = 1.9735, $p = 0.0725$). . There was also no difference in the likelihood of choosing yogurt between those who chose *chocolate milk* and *white milk* (OR = 1.770, $p = 0.2640$), and between those who selected *juice* and *no juice* (OR = 0.866, $p = 0.8266$).

Table 4. ***Logistic Regression Models of Gender, Types of Milk and Juice Selections, Types of Meal Service, Free-Reduced Meal Eligibility, and Total Enrollment on Yogurt Selection as an Entree by Secondary School Students (N=97)***

Variables		*p*	Chi-Square[3]	OR[1]	95% CI[2] OR
Gender					
Males (n=41, 7.3%[*])	Males vs. Females	0.0033	8.6063	1.931	1.244-2.996
Females (n=56, 13.7%)					
Types of Milk					
No Milk (n=66, 14.2%)	No milk vs. White milk	0.0060	7.5452	3.494	1.431-8.531
White Milk (n=6, 3.7%)	White vs. Chocolate milk	0.2640	1.2478	1.770	0.650-4.823
Chocolate Milk (n=25, 7.3%)	No milk vs. Chocolate milk	0.0725	3.2263	1.974	0.940-4.144
Selection of Juice					
Yes (n=94, 10.2%)	No vs. Yes	0.8266	0.0480	0.866	0.239-3.136
No (n=3, 5.7%)					
Types of Meal Service					
Vending outside cafeteria (n=14, 13.3%)	Vending outside vs. inside cafeteria	0.0048	7.9517	9.346	1.976-43.478
Vending inside cafeteria (n=2, 1.7%)	Cafeteria vs. Vending inside cafeteria	0.0786	3.0930	3.922	0.855-17.857
Cafeteria (n=81, 10.8%)	Vending outside cafeteria vs. Cafeteria	0.0750	3.1701	2.385	0.916-6.208
Free/Reduced Meal Eligibility (%) 61.3 ± 28.5 (20.4-84.6)[4]		0.5145	0.4249	1.003	0.993-1.013

Max- Rescaled $R^2 = 0.0855$; Likelihood Ratio: $p < 0.0001$; Degree of Freedom= 7

[1]OR=Odd Ratio; [2]CI OR=Confidence Interval; [3]Wald Chi-Square; [4]*M* ± *SD* (Minimum-Maximum)

[*]Percentage = number of students selected yogurt / total number of students

More students selected yogurt via the *cafeteria* line (10.81%) versus *all breakfast vending machines* in the secondary schools (7.17%). However, when looking at the difference between yogurt selection from the vending machines located inside or near the cafeteria versus alternate locations away from the cafeteria, students were more likely to select yogurt via the breakfast *vending machines outside the cafeteria* than *vending inside the cafeteria* (OR = 9.346, $p = 0.0048$).

CONCLUSIONS AND APPLICATION

This study examined milk, juice and yogurt selection of elementary and secondary students in a representative random sample of schools within a large urban school district, as well as some of the factors that potentially influence yogurt selection at breakfast, which may have a bearing on overall childhood nutrition and implications for food service managers. The school breakfast participation rates for elementary and secondary schools as well as for females and males were consistent with what is seen in previous literature. A decline in breakfast consumption and participation in SBP has been reported with increasing age beginning in middle school and continuing throughout adolescence (Alexy et al., 2010; Siega-Riz et al., 1998). Some of the possible influences could be related to female adolescents' concerns over weight gain (Timlin, Pereira, & Story, 2008), lack of time, lack of hunger, social stigma associated with school breakfast participation, perception of food quality, and student food preferences (Bailey-Davis et al., 2013; Reddan, Wahlstro, & Reicks, 2002). Given that food preferences and behaviors begin early in life and continue into adulthood and are influenced by both the physical and social environment, it is important to address healthful eating practices and food selection at a young age in which school meal programs offer an opportunity to provide this foundation (Patrick & Nicklas, 2005). Future research might explore socio-ecological (personal, peer, family, environment, policy) factors that would enhance school breakfast participation in secondary school students overall and within the context of a Universal Free Breakfast program.

A strength of this study was the use of unobtrusive observations with high inter-rater reliability rather than self-report. Direct observations of meals are often considered the "gold standard" in nutrition and diet assessment research (Mertz, 1992). The benefits of direct observations include practicality, ability to get unbiased data, and the fact that there is no reliance on memory related to foods selected or eaten, especially among younger children (Baglio et al, 2004). However, some limitations should be noted when interpreting the results of this study. First, this cross-sectional study used observations on only one day in each participating school. It is unknown if the food items selected on the specific day were representative of the typical pattern of students. Secondly, this study examined the selection, not the consumption, of milk and yogurt. Although there may be a correlation between the selection and the consumption of milk and yogurt, extrapolations cannot be made about the specific contribution of the dairy products on students' overall nutrition status. Thirdly, this study only included students who participated in the school breakfast. The results cannot be generalized to all elementary and secondary school students in the district. Finally, researchers did not assess the selection of milk in a representative sample prior to the addition of yogurt on the school breakfast menu. Therefore, any possible changes of patterns in the selection of dairy products were not compared among students as a result of adding yogurt at breakfast.

To our knowledge, this is one of the first studies to examine yogurt selection and predictors of yogurt selection in the SBP. Approximately 10% of both elementary and secondary students who participated in the school breakfast on the day of the observations chose yogurt as an entree' at breakfast. More males selected yogurt in the elementary schools, and more females selected yogurt in the secondary schools. This information can assist school food service managers who may be thinking about offering yogurt as an entre at breakfast with estimating yogurt selection. Additionally, these results highlight an opportunity to provide an alternate avenue (yogurt) for important nutrients for adolescent girls and non-milk drinkers, who may otherwise not choose fluid milk. Food service managers can provide marketing messages and promotions to students (adolescent girls in particular) related to benefits of yogurt.

Results indicated that elementary students who chose no milk at breakfast were more likely to choose yogurt than students who chose any kind of milk. Yogurt at breakfast appears to be a positive alternative particularly for students who do not select milk at breakfast in the elementary school. This is important in that students have access to the nutrients that dairy products provide. Additionally, these results indicate that, in this study, the selection of yogurt did not impact or replace the selection of fluid milk at the breakfast meal, which can impact meal reimbursement for school food service managers.

This study simply measured the percentage of elementary and secondary students who chose white milk and chocolate milk at breakfast and highlighted the shift from predominant selection of white milk at breakfast in elementary students to selection of chocolate milk in secondary school. These results challenge the perception that students will always select chocolate milk when offered at breakfast, but more research is needed to corroborate these findings. Additionally, chocolate milk, while criticized for its contribution of added sugars to the diets of children, provides important nutrients for growth during adolescence that might otherwise be missed if no milk is consumed. More research is needed to identify school-based strategies and messages to enhance dairy selection during the transition from childhood to adolescence that might include selections over and above chocolate milk. Further investigation is also needed to anticipate and explore the factors that influence beverage and, in particular, milk selection/consumption in the breakfast program, such as types of food being offered at breakfast, perceptions of milk, family/peer messages related to milk consumption, and beverage offerings at home.

The type of meal service was a significant predictor of yogurt selection for elementary students. Family style meal service was a strong predictor of yogurt selection in the elementary schools. School food service managers/professionals can work with school principals and other personnel to examine additional benefits of family style meal service for older students (not just preschool) and provide education around the importance of family-style meals on the selection of healthy food and minimization of meal skipping through modeling these practices at school. Future research could explore the benefits and barriers of family-style meal service in the school breakfast program.

Although a smaller number of meals were served from vending machines, a higher percentage of yogurt was selected by students who used the breakfast vending machines outside the cafeteria than those going through the cafeteria line or using the vending machines inside/near the

cafeteria. Food service managers can consider breakfast vending machines at locations outside the cafeteria with yogurt as an easy grab and go option to decrease breakfast participation barriers such as location of cafeteria to classrooms, students running late, or timing of appetite. As school breakfast programs attempt to increase access and participation, this presents an ideal opportunity to target these actions in a systematic and meaningful way.

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REFERENCES

Alexy, U., Wicher, M., & Kersting, M. (2010). Breakfast trends in children and adolescents: Frequency and quality. *Public Health Nutrition, 13*(11*),* 1795-1802. doi:10.1017/S1368980010000091

Baglio, M.L., Baxter, S.D., Guinn, C.H., Thompson, W.O., Shaffer, N.M., & Frye, F.H.A. (2004). Assessment of interobserver reliability in nutrition studies that use direct observation of school meals. *Journal of the American Dietetic Association, 104*(9), 1385-1392.

Bailey-Davis, L, Virus, A., McCoy, T.A., Wojtanowski, A., Vander Veur, S.S., & Foster, G.D. (2013). Middle school student and parent perceptions of government-sponsored free school breakfast and consumption: A qualitative inquiry in an urban setting. *Journal of the Academy of Nutrition & Dietetics, 113*, 251-257. doi:10.1016/j.jand.2012.09.017

Bergman, E.A. & Gordon, R.W.. (2010). Position of the American Dietetic Association: Local support for nutrition integrity in schools. *Journal of the American Dietetic Association, 110* (8), 1244-1254. doi:10.1016/j.jada.2010.06.014

Birch, L. L. (1999). Development of food preferences. *Annual Review of Nutrition*, *19*, 41-62.
Condon, E.M., Crepinsek, M.K., & Fox, M.K. (2009). School meals: Types of food offered to and consumed by children at lunch and breakfast. *Journal of the American Dietetic Association, 109* (2 suppl), S67-S78. doi:10.1016/j.jada.2008.10.062

Edwards, J.U., & Magel, R. (2007). Use of the Youth Risk Behavior Survey to monitor trends for nutrition and physical activity in a Midwest city school district. *Journal of School Health, 77*(7), 351-358. doi: 10.1111/j.1746-1561.2007.00219.x

Frary C.D., Johnson, R.K. , & Wang, M.Q. (2004). Childrens' and adolescents' choices of foods and beverages high in added sugars are associated with intakes of key nutrients and food groups. *Journal of Adolescent Health*, 34, 56-63.

Guinn, C.H., Baxter, S.D., Thompson, W.O., Frye, F.H.A., & Kopec, C.T. (2002). Which fourth-grade children participate in school breakfast and do their parents know it? *Journal of Nutrition Education & Behavior, 34 (*3), 159-165.

Hanks, A.S., Just, D.R., & Wansink, B. (2014). Chocolate milk consequences: A pilot study evaluating the consequences of banning chocolate milk in school cafeterias. PLoS ONE, 9(4), e91022. doi:10.1371/journal.pone.0091022

Harrel, F.E., Lee, K.L., Matchar, D.B., & Reichert, T.A. (1985). Regression models for prognostic prediction: Advantages, problems, and suggested solutions. *Cancer Treatment Reports, 69* (10), 1071-1077.

Kit, B.K., Carroll, M.D., & Ogden, C.L. (2011). Low-fat milk consumption among children and adolescents in the United States, 2007-2008. *NCHS Brief*, 75, 1-7.

Landis, J.R., & Koch,G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics,33* (1), 159-174.

Mertz, W. (1992). Food intake measurements. Is there a "gold standard"? *Journal of the American Dietetic Association, 92,* 1463-1465.

Mogharreban, C., & Nahikian-Nelms, M. (1996). Autonomy at mealtime: Building healthy food preferences and eating behaviors in young children. *Early Childhood Education Journal, 24*(1), 29-32.

Murphy, J.M. (2007). Breakfast and learning: An updated review. *Current Nutrition & Food Science, 3(1), 3-36.*

Murphy, M.M., Douglas, J.S., Johnson, R.K., & Spence, L.A. (2008). Drinking flavored milk or plain milk is positively associated with nutrient intake and is not associated with adverse effects on weight status in US children and adolescents. *Journal of the American Dietetic Association, 108* (4), 631-639. doi:10.1016/j.jada.2008.01.004

Murphy, J.M., Pagano, M.E., Nachmani, J., Sperling, P., Kane, S., & Kleinman, R.F. (1998). The relationship of school breakfast to psychosocial and academic functioning: Cross-sectional and longitudinal observations in an inner-city school sample. *Archives of Pediatric & Adolescent Medicine,* 152, 899-907.

Patrick, H. & Nicklas, T. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition, 24*(2), 83-92.
Pollitt, E. (1995). Does breakfast make a difference in school? *Journal of the American Dietetic Association, 95*, 1134-1139.

Reddan, J., Wahlstrom, K., & Reicks, M. (2002). Children's perceived benefits and barriers in relation to eating breakfast in schools with or without Universal School Breakfast. *Journal of Nutrition Education & Behavior 34*(1):47-52.

Rizzoli, R. (2014). Dairy products, yogurts and bone health. *American Journal of Clinical Nutrition, 99* (supplement),1256S – 1262S. doi:10.3945/ajcn.113.073056

Siega-Riz, A.M., Popkin, B.M., & Carson, T. (1998). Trends in breakfast consumption for children in the United States 1965-1991. *American Journal of Clinical Nutrition, 67,*748S –756S.

Smith, T.M., Kolars, J.C., Savaiano, D.A., & Levitt, M.D. (1985). Absorption of calcium from milk and yogurt. *American Journal of Clinical Nutrition, 42* (6), 1197-1200.

Stang, J. & Bayerl, C.T. (2010). Position of the American Dietetic Association: Child and adolescent nutrition assistance programs. *Journal of the American Dietetic Association, 110* (5), 791-799. doi:10.1016/j.jada.2010.02.025

Timlin, M.T., Pereira, M.A., & Story, M. (2008). Breakfast eating and weight change in a 5-year prospective analysis of adolescents: Project EAT (Eating Among Teens). *Pediatrics, 121*, 638-645. doi:10.1542/peds.2007-1035

U.S. Census Bureau. (2010). *2010 Census population search*; Ohio. Retrieved from http://www.census.gov/2010census/popmap/ipmtext.php?fl=39

U.S. Department of Agriculture: Food and Nutrition Service. (2007). *School Nutrition Dietary Assessment Study-III: Vol. II: Student participation and dietary intakes*, by Anne Gordon, et al. Project Officer: Patricia McKinney. Alexandria, VA. Retrieved from: http://www.fns.usda.gov/sites/default/files/SNDAIII-Vol2ExecSum.pdf

U.S. Department of Agriculture; Food and Nutrition Services. (2012). *School Nutrition Dietary Assessment Study-IV: Summary of findings*. Retrieved from http://www.fns.usda.gov/sites/default/files/SNDA-IV_Findings_0.pdf

U.S. Department of Health and Human Services, & U.S. Department of Agriculture. (Dec 2010). *Dietary Guidelines for Americans 2010*. 7th Edition. Washington D.C.: U.S. Government Printing Office.

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