

Examining Variations in Fourth-Grade Children's Participation in School Breakfast and Lunch Programs by Student and Program Demographics

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Please note that this study was published before the SY2014-15 implementation of the Smart Snacks Nutrition Standards for Competitive Food in Schools, as required by the Healthy, Hunger-Free Kids Acts of 2010. As such, certain research relating to food in schools may not be relevant today.

ABSTRACT

Purpose/Objectives

Analyses were conducted to examine variations in fourth-grade children's participation in school-breakfast and school-lunch programs by weekday, month, socioeconomic status, absenteeism, gender, and school-breakfast location.

Methods

Fourth-grade children were participants in a dietary-reporting validation study during either the 2005–2006 or 2006–2007 school years in 17 or 8 schools, respectively, in one South Carolina school district. For the two school years, the location of the school breakfast was the classroom for 6 and 7 schools, respectively, and the cafeteria for the remaining schools. District administrative records provided information about 180 possible days of participation in the school breakfast and lunch programs for each of 1,060 children (91% Black, 52% girls). The state's Office of Research and Statistics linked data on school-meal participation with information about individual children's socioeconomic status (eligibility for free or reduced-price school meals) and annual absenteeism from school.

Results

For school-provided breakfast, logistic regression showed participation rate differences by weekday (smallest for Monday [56.1%], largest for Wednesday [57.8%], $p < .001$), month (smallest for April [53.5%], largest for September [60.8%], $p < .001$), socioeconomic status (smallest for full-price status [27.5%], largest for free-meal status [63.4%], $p < .001$), school-breakfast location (smaller for breakfast located in the cafeteria [38%] than classroom [71%], $p < .001$), and absenteeism ($p < .001$). For school-provided lunch, logistic regression showed participation rate differences by weekday (smallest for Friday [81.9%], largest for Thursday [83.3%], $p < .001$), month (smallest for May [78.7%], largest for August [86.0%], $p < .001$), socioeconomic status (smallest for full-price status [72.1%], largest for free-meal status [84.9%], $p < .001$), and absenteeism ($p < .001$). There were no differences in participation rate by gender.

Applications for Child Nutrition Professionals

Administrative participation records are used for forecasting purchasing and production. Using such records in research studies may provide insight into factors influencing children's participation in school-provided meals. Districts and managers are encouraged to share administrative records of children's participation in school-provided meals with researchers.

INTRODUCTION

Meals provided by the School Breakfast Program (SBP) and National School Lunch Program (NSLP) are valuable sources of nutrition for millions of children. Each school day during fiscal year 2011, an average of 12.1 million and 31.8 million children participated in the SBP and NSLP, respectively (U.S. Department of Agriculture [USDA], Economic Research Service, 2012). Most (94%) U.S. schools participate in NSLP (Ralston et al., 2008). Most (91.2%) schools that participate in NSLP also offer SBP (Food Research and Action Center, 2013).

School-meal participation may be affected by factors such as weekday and month. A literature review found no studies that examined differences in participation by weekday. Concerning month, during the 2011–2012

school year, 32 million U.S. children participated in NSLP in September, while 30.4 million participated in May (USDA, Food and Nutrition Service, 2013). Administrative records from a national sample of low-income children (across elementary, middle, and high school) showed that monthly participation rates were fairly consistent over the 2005–2006 school year, ranging from 67% to 72% for NSLP and 30% to 37% for SBP (Moore, Hulsey, & Ponza, 2009); however, that study did not determine whether participation differed by month.

Concerning socioeconomic status, children are eligible for free or reduced-price school-provided meals if their families have incomes = 130% of the poverty level, or > 130% but = 185% of the poverty level, respectively; others pay full price (USDA, Economic Research Service, 2011). The School Nutrition Dietary Assessment Study (SNDAS)-III showed that lower-income children reported greater SBP and NSLP participation than higher-income children (Bartfeld & Kim, 2010; Gordon & Fox, 2007). For SNDAS-IV, school nutrition (SN) managers reported that daily SBP and NSLP participation was greater for lower-income than higher-income children (Fox & Condon, 2012).

Research has shown that children who eat school-provided breakfast have lower absenteeism (Murphy et al, 1998; Pollitt & Mathews, 1998). To the authors' knowledge, no studies have examined absenteeism and NSLP participation.

Studies have examined differences in participation by gender and race. In the Kindergarten Cohort Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K), using parental reports regarding third-grade children, the probability of SBP participation was highest among blacks, and higher among all other racial/ethnic groups than whites, but there were no gender differences (Bartfeld & Kim, 2010). In a study of fourth-grade children (Guinn, Baxter, Thompson, Frye, & Kopec, 2002), SBP participation, based on nametag records compiled by researchers for meal observations, was higher for Black students than White students, but there were no gender differences. In SNDAS-III, using interviews from a national sample of students, boys participated more in SBP and NSLP than girls, and non-Hispanic Black and Hispanic students participated more than non-Hispanic White students and students of other races/ethnicities (Gordon & Fox, 2007). Using administrative records from a national sample of low-income children across elementary, middle, and high school, Moore et al. (2009) provided pertinent findings. First, boys were more likely to participate in SBPs than girls, but there were no differences in NSLP participation by gender. Second, examination of gender differences in school-meal participation by school type revealed differences for high-school students, but not elementary and middle-school students; high-school boys obtained both school breakfast and school lunch at 5% more eating occasions than high-school girls. Third, low-income Black and Hispanic children were more likely to participate in NSLP than other racial/ethnic groups, but there were no differences in SBP participation by race (Moore et al., 2009).

While most U.S. schools participate in the SBP (Food Research and Action Center, 2013), SNDAS-IV showed that in schools offering SBP, average daily participation was only 28% (Fox & Condon, 2012). The location of the SBP may influence participation. The SBP Pilot Project found greater participation for breakfast located in the classroom (66%) than in the cafeteria (28%) (Bernstein, McLaughlin, Crepinsek, & Daft, 2004).

Studies that examine school-meal participation need to consider the source of participation information. For a study of fourth-grade children, parental responses on consent forms to the question "*Does this child usually eat school breakfast?*" were compared to nametag records compiled by researchers for meal observations (Guinn et al., 2002); 24% of parents gave incorrect responses. For another study among a national sample of children, parental responses were compared to district administrative records; parental responses concerning children's participation (i.e., receipt of a reimbursable school meal) were more accurate for one day or one week's participation than for annual participation, and more accurate for NSLP than SBP (Moore et al., 2009). These results emphasize the importance of using an information source that does not rely on parental responses about children's participation.

The current analyses examined variations in children's participation in SBP and/or NSLP during the fourth-grade school year by weekday, month, socioeconomic status, absenteeism, gender, and variations in children's participation in breakfast by SBP location. Children were participants in a dietary-reporting validation study (Baxter et al., 2009).

METHODOLOGY

For the dietary-reporting validation study, the Institutional Review Board of the University of South Carolina approved data collection. Children provided written assent, and parents provided written consent. By signing the consent form, parents granted permission for the district to release information to researchers about fourth-grade children’s daily participation in school-provided breakfast and lunch (i.e., obtaining SBP and NSLP meals).

Data collection occurred during the 2005–2006 and 2006–2007 school years in 17 and 8 (of the same 17) public schools, respectively, in one district. At these schools, for the two respective school years, 83% (range by school: 49% to 95%) and 89% (76% to 95%) of children were eligible for free or reduced-price school-provided meals. For the two respective school years, of the children invited to participate, 76% and 72% agreed (Baxter et al., 2009). For this article’s analyses, the sample was 692 and 368 children for the first and second school years, respectively, for a total of 1,060 children with 91% Black and 52% girls; this was approximately 39% and 21% of fourth-grade children in the district for the two school years, respectively.

The district used four-week cyclical menus and provided meals that complied with SBP and NSLP standards (USDA, Food and Nutrition Service, 2007). The district had implemented “offer-versus-serve” food service, so children could refuse some meal components (USDA, Food and Nutrition Service, 2004).

Each school year began in August and ended in May and contained 180 school days. Table 1 provides information on the number of school days by weekday and month for the 2005–2006 and 2006–2007 school years. The district provided researchers with administrative records containing information about individual children’s daily participation (i.e., receipt of a reimbursable school meal) in school-provided breakfast and lunch on 180 possible school days during the fourth-grade school year.

Table 1. *Number of School Days by Weekday and by Month for Two School Years (2005–2006, 2006–2007)*^a

	2005–2006 School Year	2006–2007 School Year
Weekday		
Monday	34	32
Tuesday	38	38
Wednesday	36	37
Thursday	36	37
Friday	36	36
Month		
August	18	18
September	21	20
October	20	21
November	19	18
December	12	13
January	18	19
February	19	19

	2005–2006 School Year	2006–2007 School Year
March	21	20
April	15	15
May	17	17

^aEach school year began in August, ended in May, and contained 180 school days.

Eligibility for free and reduced-price school meals was used as a proxy for socioeconomic status. Staff at the South Carolina Budget and Control Board Office of Research and Statistics (ORS) obtained information from the district about individual children’s eligibility for free, reduced-price, or full-price school-provided meals.

For each child, the district provided ORS with the number of days that each child was absent of 180 school days. The number of days that a child was absent was used as the absenteeism variable for that child.

Meal times were consistent for a school within a school year; breakfast and lunch each lasted approximately 30 minutes per class. Most schools offered á la carte lunch items (e.g., cookies, juice).

At each school, the principal determined the breakfast location (cafeteria, classroom); during the school year, this location remained unchanged. For the 17 schools in the 2005–2006 school year, the classroom was the location for 6 schools and the cafeteria for 11 schools. For the 8 schools in the 2006–2007 school year, the classroom was the location for 7 schools and the cafeteria for 1 school. One school changed its breakfast location from the cafeteria for the first school year to the classroom for the second school year. For both locations, school-provided breakfast was scheduled before the school day began. For breakfast located in the classroom, SN personnel packed an insulated bag or cooler each day for each classroom containing enough breakfasts for each child in the class.

To ensure that confidentiality was maintained, ORS conducted analyses using children’s names and dates of birth to link data on school-meal participation with data on absenteeism and socioeconomic status. For breakfast and lunch separately, a logistic regression model was fit, using generalized estimating equations methodology. The dependent variable, participation, was 1 or 0 depending on whether the child participated in the school-provided meal that particular day out of 180 school days. Independent variables were weekday, month, socioeconomic status category, absenteeism, gender (provided by schools), and school year (for breakfast, location at school was also an independent variable). Each model also included two interactions (absenteeism × gender, absenteeism × socioeconomic-status-category); as neither interaction was significant in either model (p -values > .241), the interactions were removed and the models were re-run. Each model accounted for repeated measurements on children (for 180 school days), with children nested in school. This allowed observations on the same children (as well as observations on different children within the same school) to be potentially correlated.

For inferences about the regression coefficients, simultaneous tests were corrected for by comparing p -values to a Bonferroni-corrected criterion ($.05/7 = .007$ and $.05/6 = .008$ for the breakfast and lunch models, respectively, because the models had different numbers of independent variables).

RESULTS AND DISCUSSION

For 1,060 fourth-grade children, the participation rate for school-provided breakfast was 57%, and for school-provided lunch was 83%. Of 1,060 children, 844 (80%) were eligible for free school-provided meals, 56 (5%) were eligible for reduced price, and 160 (15%) paid full price. As the following sub-sections explain, participation differed by weekday, month, socioeconomic status, and absenteeism for both school-provided breakfast and lunch. Also, participation differed by location for school-provided breakfast. However, participation did not differ by gender or school year for either school-provided breakfast or lunch.

Weekday

Figure 1 shows participation rate by weekday for school-provided breakfast and lunch. For each weekday, for breakfast and lunch separately, participation rate was calculated as the number of days participated divided by the number of days possible; Figure 1’s footnote provides an example.

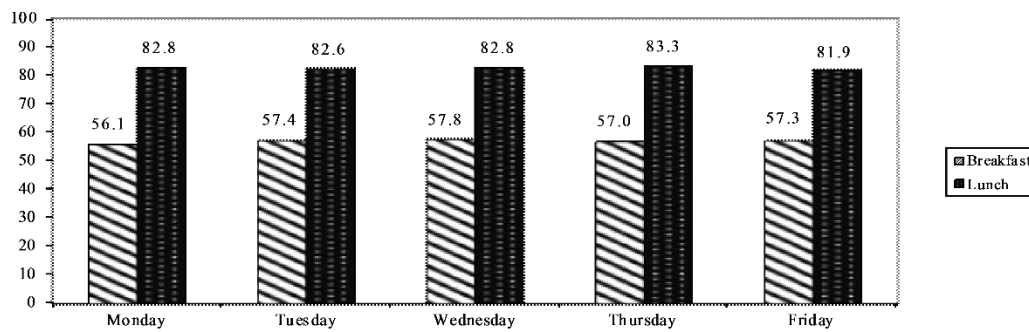


Figure 1. Participation rate^a by weekday for school-provided breakfast and lunch for 1,060 children^b during their fourth-grade school year (2005–2006 or 2006–2007).

^aFor each weekday, for school-provided breakfast and lunch separately, the participation rate was calculated as the number of days participated divided by the number of days possible. For example, for breakfast, across all 1,060 children, there were 19,800 Mondays on which children participated and 35,304 possible Mondays on which they could have participated, so the participation rate for breakfast on Monday was $19,800/35,304 = 56.1\%$; there were 22,261 Wednesdays on which children participated and 38,528 possible Wednesdays on which they could have participated, so the participation rate breakfast for Wednesday was $22,261/38,528 = 57.8\%$.

^bAn individual fourth-grade child was in the study during one of the two school years (2005–2006 or 2006–2007); 692 children were in the study during the 2005–2006 school year and 398 children were in the study during the 2006–2007 school year, for a total of 1,060 children.

For each school meal, logistic regression showed differences in participation rate by weekday (p -values < .001). For school-provided breakfast, participation rate was smallest for Monday (56.1%) and largest for Wednesday (57.8%). For lunch, participation rate was smallest for Friday (81.9%) and largest for Thursday (83.3%). In practical terms, differences between the smallest and largest rates were approximately 2,400 children for breakfast and 900 children for lunch.

The authors were surprised that school-meal participation rates differed by weekday. SN professionals employed in high poverty districts may have perceived greater participation on Mondays and thought it was because children were hungry from the weekend. However, other than the current study for which participation rates were smallest for breakfast on Monday, the authors know of no other studies that have examined differences in participation in school-provided meals by weekday. Although data were not collected for this study to investigate reasons why participation differed by weekday, the following are possible explanations: Children (and parents) may have started each week with eating breakfast at home, and then opted for the ease of children eating school-provided breakfast later in the week. Perhaps children skipped school-provided breakfast on Mondays because they were too tired to eat on Monday morning after staying up late on weekend nights, or children were late on Monday mornings causing them to miss school-provided breakfast. If children left school early on Fridays for the weekend then they may have missed school-provided lunch.

Menu options may also explain differences in school-meal participation by weekday. Districts may use cyclical menus that repeat every few weeks, resulting in the same foods that appeal less to children being offered on the same weekdays. Foods offered on Fridays may appeal less to children than foods offered on other weekdays. Examination of the association of menu options and school-meal participation provides helpful information for school-food administrators; for example, is participation less on days when meatloaf is offered and greater on days when pizza is offered?

Month

Figure 2 shows participation rate by month for school-provided breakfast and lunch. For each month, for breakfast and lunch separately, participation rate was calculated as the number of days participated divided by the number of days possible.

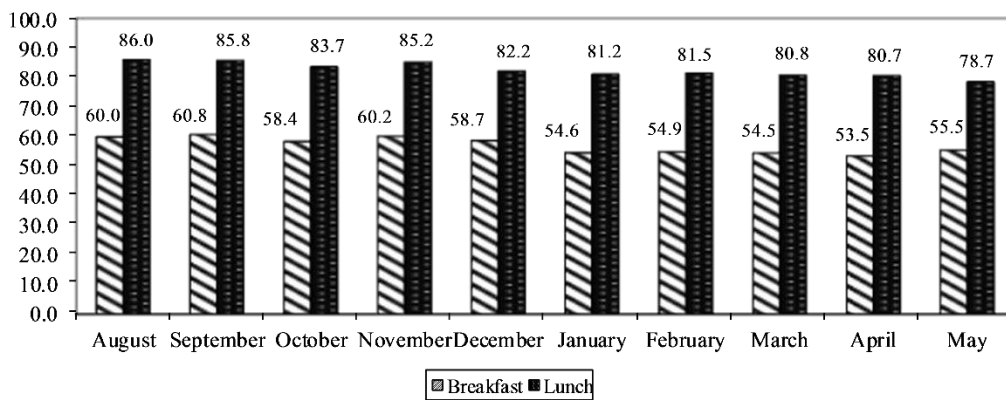


Figure 2. Participation rate^a by month, for school-provided breakfast and lunch for 1,060 children during their fourth-grade school year (2005–2006 or 2006–2007).

^aFor each month, for school-provided breakfast and lunch separately, the participation rate was calculated as the number of days participated divided by the number of days possible. For example, for breakfast, across all 1,060 children, there were 11,449 days in August on which children participated and there were 19,080 possible days in August on which children could have participated; thus, the participation rate in breakfast for August was $11,449/19,080 = 60.0\%$.

For each school meal, logistic regression showed differences in participation by month (p -values < .001). For school-provided breakfast, participation rate was smallest for April (53.5%) and greatest for September (60.8%); for school-provided lunch, participation rate was smallest for May (78.7%) and greatest for August (86.0%).

The authors were surprised that participation in school-provided meals differed by month and know of no other studies that have examined differences in school-provided meal participation by month. Perhaps children participated in school-provided meals less towards the end of the school year because they grew tired of menu items available on school-provided meals. This could not be investigated because data concerning preferences for menu items were not collected for the school-based study that provided data for the current article’s analyses.

Socioeconomic Status

Figure 3 shows participation rate by socioeconomic status for school-provided breakfast and lunch.

Figure 3. Participation rate^a by socioeconomic status category for school-provided breakfast and lunch, for 1,060 children during their fourth-grade school year (2005–2006 or 2006–2007).

^aFor each socioeconomic status (using eligibility for free/reduced-price school-provided meals as the proxy measure) category, for school-provided breakfast and lunch separately, the participation rate was calculated as the number of days participated divided by the number of days possible. For example, for the 844 children who were eligible for free meals, there were 96,303 days on which those children participated and there were 151,920 possible days on which those children could have participated; thus, the participation rate in breakfast for children who were eligible for free meals was $96,303/151,920 = 63.4\%$.

For each school meal, logistic regression showed differences in participation by socioeconomic status (p -value $< .001$). For school-provided breakfast, participation rate was smallest for full-price status (27.5%) and greatest for free-meal status (63.4%); for school-provided lunch, participation rate was also smallest for full-price status (72.1%) and greatest for free-meal status (84.9%). These findings were expected. Previous research has shown that school-meal participation and socioeconomic status are inversely related. As mentioned in the introduction, reported participation in SBP and NSLP were greater for lower-income children than higher-income children in SNDAS-III. Similarly, data from ECLS-K showed that third-grade children's participation (as reported by parents) in SBP was inversely associated with family income (Bartfeld & Kim, 2010).

Similar to other studies, study results demonstrated a large gap between the participation rate for the SBP (57%) and percent of children eligible for free school-provided meals (80%). In the state where data were collected, for the 2005–2006 and 2006–2007 school years, 57.2 and 59.2 low-income children, respectively, participated in the SBP for every 100 low-income children participating in the NSLP (Food Research and Action Center, 2007). Using school-level district reports from a national sample of schools in October 2005, Moore et al. (2009) found that, among children certified for free and reduced-price meals, participation rates were 37% and 77% for SBP and NSLP, respectively. Thus, even for children eligible for free or reduced-price school meals, many often are "not at the table" and fail to receive full benefits because participation is lower than eligibility, especially for breakfast.

Absenteeism

For each of school-provided breakfast and lunch, logistic regression showed differences in participation by annual absenteeism (p -values $< .001$) which was inversely related to participation. This finding was expected. It is logical that children who are absent from school are not present to participate in school-provided meals. Unfortunately, ORS's absenteeism data for individual children consisted of the number of days missed for the school year; thus, ORS did not have specific dates of individual children's school absences, which precluded the ability to match days absent with dates when school-meal participation was missed.

Gender

For each of school-provided breakfast and lunch, logistic regression failed to show differences in participation by gender ($p > .0535$ and $p > .7245$, respectively). For school-provided breakfast, the participation rate was 59% for boys and 56% for girls. For school-provided lunch, the participation rate was 83% for boys and 83% for girls.

These lack of gender differences in school-meal participation are similar to results found by Dwyer et al. (1998), Guinn et al. (2002), and Moore et al. (2009) for NSLP, but conflicts with results found for SNDAS-III (Gordon & Fox, 2007). It is worth noting that Moore et al. (2009) and SNDAS-III examined participation rates for children across elementary, middle, and high school, while the current study was limited to fourth-grade children. While Moore et al. (2009) examined gender differences by school type (elementary, middle, and high school); there were no gender differences for elementary-school children for either SBP or NSLP participation.

School-Breakfast Location

Logistic regression showed that participation was less for school-provided breakfast located in the cafeteria than in the classroom ($p < .001$); children participated in school-provided breakfast located in the cafeteria on an average of 68.5 days, while children participated in school-provided breakfast located in the classroom on an average of 127.4 days. This translates into participation rates of 38% for school-provided breakfast located in the cafeteria and 71% for school-provided breakfast located in the classroom.

These participation rates are similar to the rates found in the SBP Pilot Project (Bernstein et al., 2004). These findings were expected. Data from ECLS-K showed that the probability of SBP participation was positively associated with breakfast located in the classroom (Bartfeld & Kim, 2010). In 2010, the Food Research and Action Center conducted surveys with SN staff regarding participation in SBP (Food Research and Action Center, 2011); a key finding was that districts with breakfast located in the classroom had the largest participation in SBP.

Despite the positive influence of school-provided breakfast located in the classroom on participation, food safety implications including clean surfaces and hand hygiene may be a concern. SN directors report problems including insect infestations, spillage, refuse collection, meal accountability, teacher resistance, and difficulty procuring foods appropriate for serving in the classroom (Bernstein et al., 2004).

School Year

For each of school-provided breakfast and lunch, logistic regression failed to show differences in participation

between the two school years (p -values = .2746). For school-provided breakfast, the participation rate was 51% and 68% for the two respective school years. For school-provided lunch, the participation rate was 82% and 84% for the two respective school years.

Discussion

There are several study limitations to consider. The school-based study that provided the data analyzed was not designed to examine variations in school-provided meal participation. Data collected were only for children's fourth-grade school year, whereas data for multiple school years (e.g., first-grade through fifth-grade school years) would provide a better understanding of these relationships. Also, differences in participation by specific menu items were not examined. The sample included children from one district. The children's race was primarily Black, so differences in school-provided meal participation by race could not be analyzed. Information concerning individual children's specific dates of school absences was not available to match with days when participation in school meals was missed. Data were not collected on every variable that could impact school-meal participation, such as recess before or after lunch and encouragement by teachers or SN staff to take/eat food items.

An important strength to consider is the use of an objective measure: administrative records of daily participation in school-provided meals. This avoided reliance on children's self-reports, or on parental reports, of participation.

Investigation of administrative records of daily school-meal participation may be useful to SN program operations and planning of budgets and menus. For example, if a district's administrative records reveal that participation in SBP is smallest on Mondays, then the district might want to consider a campaign to "start the week right with breakfast at school." Likewise, if a district's administrative records reveal that participation in NSLP is smallest on Fridays, then the district might want to consider a campaign to "end the week right with lunch at school." Also, daily production records and daily administrative records of participation could be examined to identify the availability of specific food items on the menu, and how the availability of specific food items affects participation. Future research could investigate the effect that "cooks' choice" on Fridays has on meal participation, as well as the effect of moving popular menu offerings to traditionally low participation days.

Research has shown a positive relationship between satisfaction with taste of school meals and participation in school-provided meals (Moore et al., 2009). Schools should consider preferences for food items when planning school-meal menus, as well as tips for offering new food items, such as taste tests and creative marketing and presentation of foods (USDA, Food and Nutrition Service, n.d.). The current article's results showed that participation in school-provided meals was lower toward the end of the school year. Perhaps schools could use seasonal cycle menus to avoid children tiring of food items on school-provided meals. Also, marketing strategies could be implemented to improve school-meal participation, and to positively impact what the children actually consume (Just & Wansink, 2009).

Investigation of administrative records of daily participation in school-provided meals could also provide new information for districts and school-meal programs. For example, concern has been raised that school-meal programs may contribute to childhood obesity. Administrative records were used by Baxter et al. (2010) along with measurements of fourth-grade children's weight and height to investigate a relationship between participation in school-provided meals and children's body mass index (BMI); results failed to show a significant association between BMI and participation in SBP, NSLP, or combined (both meals on the same day) irrespective of whether the model included observed energy intake at school meals.

Since 2004, each district is required to develop, implement, and measure the implementation of a local wellness policy that promotes children's health and reduces childhood obesity (Child Nutrition and WIC Reauthorization Act of 2004; Healthy, Hunger-Free Kids Act of 2010); thus, schools may be adding morning activities such as "fun runs;" however, if these activities are scheduled to conflict with the time that SBP is available, they could decrease SBP participation. Future research could collect data concerning individual children's participation in fun runs, and measure children's weight and height, and then link these data with administrative records of SBP participation. Scheduling SBP as part of the school day, rather than before the school day begins, might help prevent such conflicts with other activities at school.

Future research could also link information on daily absenteeism at the individual child level with school-meal participation. For example, this information could then be used to examine whether children are absent more often on particular weekdays or during particular months, and how that relates to school-meal participation.

The current article's results showed that children's SBP participation was less than NSLP participation, even when the meals were provided for free or at a reduced price. Research has demonstrated benefits related to participating in SBP, including an association between SBP participation and better achievement test scores (e.g., Vaisman, Voet, Akivis, & Vakil, 1996), and an inverse association between SBP participation and BMI (Gleason & Dodd, 2009). As a way to increase SBP participation, schools should consider implementing breakfast located in the classroom. The current article adds to the literature (Bartfeld & Kim, 2010; Food Research and Action Center, 2011) showing that breakfast located in the classroom is associated with greater SBP participation. There may be other benefits as well. For example, in a 2008 study (Rainville & Carr, 2008), breakfast located in the classroom was implemented in three schools (one elementary; two middle) in three districts across the U.S.; results showed benefits of breakfast in the classroom including increased participation in SBP, fewer disciplinary referrals, and increased student responsibility. Additional benefits of breakfast located in the classroom include improved attendance and fewer visits to the school nurse (Food Research and Action Center, 2010). Despite these benefits, it should be noted that the investigation by Baxter et al. (2010) showed average BMI was larger for children with school-provided breakfast located in the classroom than in the cafeteria. In addition, results from that investigation showed that, for a subset of children who were observed eating school-provided meals, more kilocalories were observed eaten at school-provided breakfast located in the classroom than in the cafeteria (Baxter et al., 2010). Further research on the association of SBP breakfast location and BMI is needed.

Another option to increase SBP participation is to schedule SBP as part of the school day (Food Research and Action Center, 2013). The article by Rainville and Carr (2008) specified that in two of the schools (one elementary, one middle), breakfast located in the classroom was scheduled as part of the school day; in the elementary school children ate breakfast while doing morning work, and in the middle school children ate breakfast while teachers began the first lesson. In one study, fourth- and fifth-grade children and their parents participated in focus groups to determine why children do or do not participate in SBP (Sabol, Struempfer, & Zizza, 2011). Results showed that the most frequently mentioned barrier to SBP participation was timing and scheduling. In particular, children reported arriving late for SBP due to late buses, sleeping late, or a delay caused by parents (Sabol et al., 2011). Although not investigated by Sabol et al. (2011), logic dictates that schools that start earlier will have more children who are running late, and as a result, do not participate in SBP. Although the Rainville and Carr (2008) study located breakfast in the classroom to schedule it as part of the school day, another way to do this is to locate breakfast in the cafeteria as is done with NSLP. By locating school-provided breakfast in the cafeteria and scheduling it as part of the school day, allowing instructional minutes to be credited, schools could overcome the barrier of timing and scheduling related to SBP participation.

CONCLUSIONS AND APPLICATION

Analyses conducted for this article used data from a school-based dietary-reporting validation study with children to examine variations in participation in school-provided meals during the fourth-grade year. Information about individual children's daily participation in the SBP and/or NSLP was obtained from district administrative records. Results showed that participation in school-provided breakfast and lunch differed significantly by weekday, month, socioeconomic status, and absenteeism, but not gender or school year. Also, school-breakfast location influenced participation in school-provided breakfast.

Administrative records of children's participation in school-provided meals are often used for forecasting purchasing and production. The use of administrative participation records in research studies may provide new and helpful insight into various aspects of children's participation in school-provided meals. However, there are currently few published studies that have reported using such records. Districts and managers are encouraged to share administrative records of children's daily participation in school-provided meals with researchers for use in studies, and to report results in publications.

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